AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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Volume 86
Number Four
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FEBRUARY, 1922

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W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

National Sulfindone Blue B Conc.

An Indigo Shade Sulfur Color

The "National" submits this new product, yielding indigo shades, as superior to any dye of its class that has ever been offered in this market.

Your inquiries as to its exceptional properties are invited.

National Aniline and Chemical Co., Inc.

New York
Boston
Chicago
Hartford
Charlotte

THE FIRST AND LARGEST MAKERS of COAL-TAR DYES IN AMERICA

Montreal
Toronto
Providence
Philadelphia
San Francisco

NATIONAL U.S.A. DYES

NATIONAL DYES

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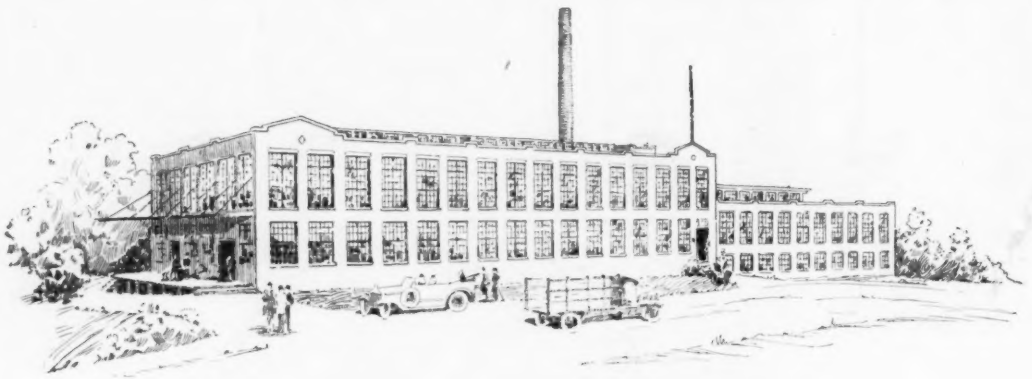

ANOTHER MILESTONE

ABOUT a year ago we had the pleasure of announcing the completion of our new Providence plant—"the most economical dye house in the world." Now we are illustrating another milestone along our path of progress in the form of our newest, ultra modern dye house which is nearing completion at Greenville, S. C. This will be the fourth in our chain of dye houses, as we already have plants in Providence, Philadelphia and Manchester, Eng.

All yarn in our plants is dyed on Franklin Packages in Franklin Process Dyeing Machines. Franklin packages are parallel tubes, and we return your yarn on these tubes or, where desired, on cones or paper tubes.

The Franklin Process is very economical, eliminating skeins and chain warps, with their attendant waste and has been no small factor in our rapid growth. The combined capacity of our four plants today is 200,000 lbs. per week.

Colors dyed by the Franklin Process have established a reputation for unusual brilliancy, solidity and penetration to such an extent that manufacturers who use our service will find it of advantage to merchandise the fact that their goods are Franklin Dyed.

Our job dyeing has enabled white goods manufacturers to make colored shirting, voiles and dress goods without buying extra equipment. They ship yarn to us on spinning bobbins, cones and parallel tubes; we wind it on parallel dyeing tubes and return it to them ready for use in the V creel for warping.

We shall consider it a privilege to consult with the trade regarding the advantages of our dyeing process.

The trade is cordially invited to inspect our new, modern plants.

FRANKLIN PROCESS CO.

Philadelphia—Greenville, S. C.—Manchester, Eng.

PROVIDENCE, R. I., U. S. A.

Job Dye Houses in All Four Cities.

NORTHROP

TRADE-MARK REG U S PAT OFF

LOOMS

ON COTTON GOODS

AND MOST WORSTEDS THAT CAN BE WOVEN

WITH ONE SHUTTLE

SAVE 50 TO 75 PER CENT.

OF THE LABOR COST OF WEAVING

AND

PRODUCE BETTER GOODS

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

ATLANTA GEORGIA

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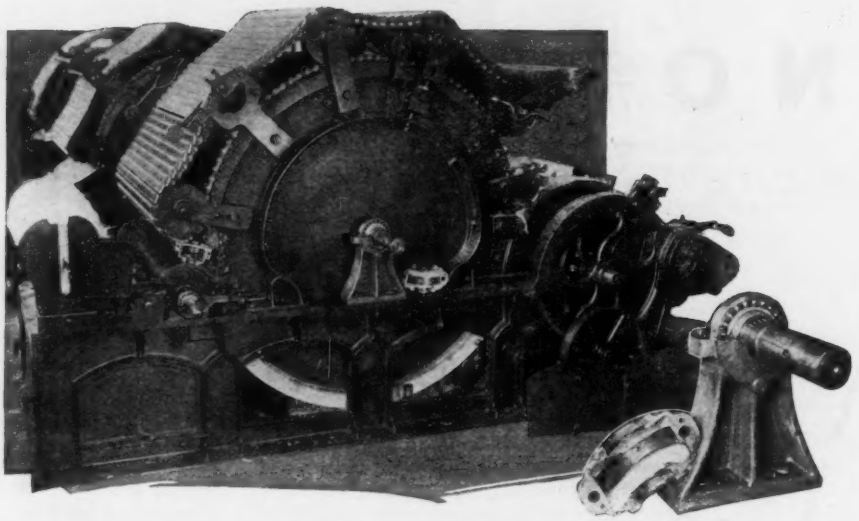
SKF



The Wearproof Foundation For Permanent Card Settings

WHEN bearings wear, on the lickerin or main cylinder on a card, the cylinders change position. It is impossible under such conditions to maintain accurate settings at these parts and the entire operation of the card suffers—particularly if one bearing has worn more than another so that the cylinders are thrown out of alignment.

The economy of SKF marked *self-aligning* ball bearings is due to the fact that they are practically wear-proof—once a setting is made it is *maintained* accurately in everyday operation. Added to this is the fact that they save power, enable easy starting, decrease lubrication bills fully 80 percent, and save the card clothing.

Many experienced carders prefer machines equipped with SKF Marked Ball Bearings. Our Engineering Department will be glad to show how you can eliminate an expensive problem on your cards; all information and estimates being furnished free.

THE SKAYEF BALL BEARING COMPANY

Supervised by SKF INDUSTRIES, INC., 165 Broadway, New York City

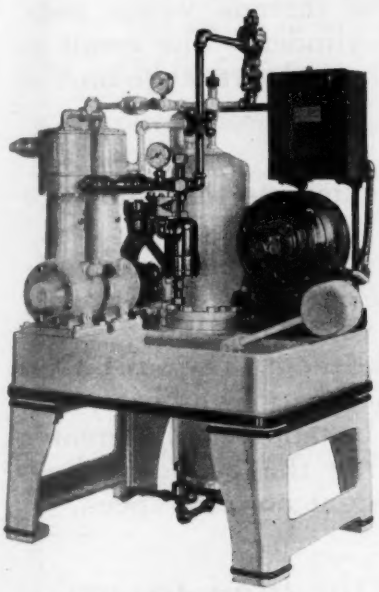
710

706

Lipman

FULL-AUTOMATIC REFRIGERATING MACHINES

Drinking Water Systems



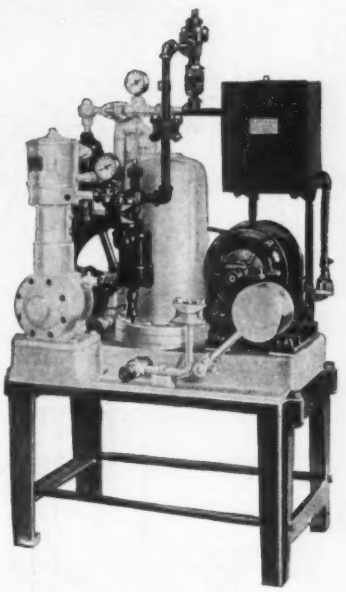
"MODERNIZE"

Supply your Workers with a constant supply of Cool, Palatable Drinking Water at a UNIFORM Temperature the year round.

—SAVE—

By eliminating the tremendous cost and the unsanitary features of the Old Icing Methods.

Increased Efficiency Means Increased Production. Cool water at a constant even temperature increases the efficiency of your Workers.



AUTOMATIC !

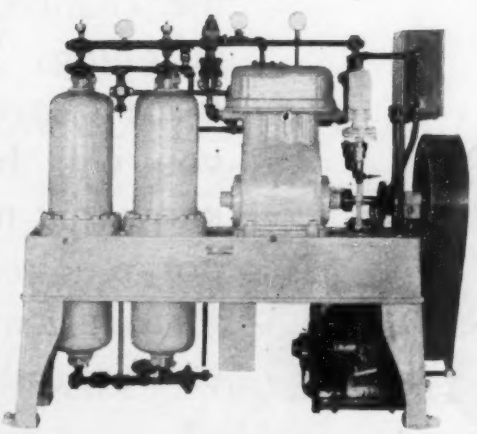
THE LIPMAN AUTOMATIC

is a compact, self contained unit, taking up practically no space.

It operates at a very low cost.

It is fully and absolutely automatic.

EFFICIENT !



ECONOMICAL !

Our Engineers will be glad to call on you and submit estimates on your plant. No obligation on your part.

A LIPMAN PROVES ITSELF. Get in touch with us NOW.

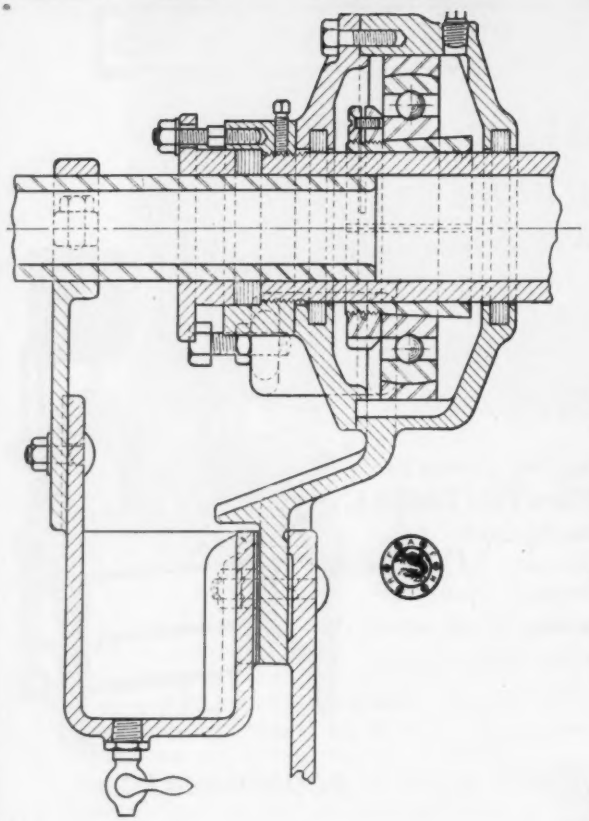
We Guarantee all Installations.

WRITE FOR COMPLETE INFORMATION

Miles Refrigerating Company

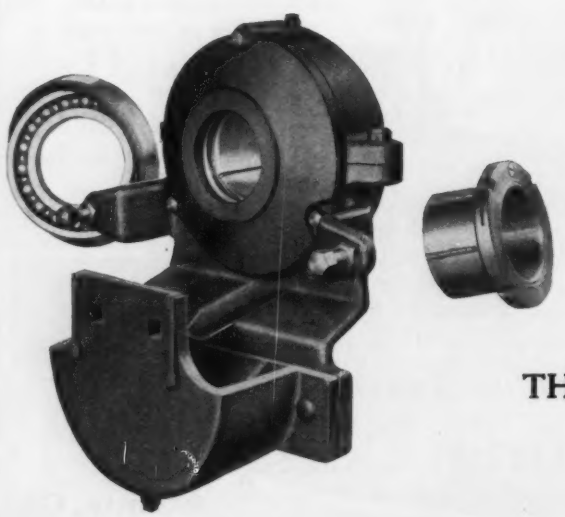
292 Peachtee Street, Atlanta, Ga.

FAFNIR



You know that when a plain slasher cylinder is driven by the yarn, the strain stretches and weakens the countless fine threads which pass around the cylinder. The result is severe loss through breakage on the loom.

You can eilminate this difficulty completely by re-equipping your slasher cylinders with ***Fafnir Self-Aligning Ball Bearing Boxes,*** which are as nearly frictionless as science can make them. The pull on the yarn will then be insignificant, and it will not be appreciably greater when starting the cylinder than when running at uniform speed.



Now is the time to make the change to ***Fafnir Self-Aligning Ball Bearings.*** It can be done easily and you will be interested to know that new journals are not required, which means that the change can be made economically.

THE FAFNIR BEARING COMPANY

Conrad Patent Licensee

New Britain, Conn.

Southern Representative,

O. R. S. Pool, P. O. Box 1375, Greenville, S. C.

CHANGES

Two and one-half years ago, the entire capital stock of The Moore Oil Company was purchased by The Ohio Cities Gas Co. The name of our organization was then changed to The Moore Oil Refining Co. Some time after this change in name was made, our Parent Organization came out under a new title—THE PURE OIL CO.—a name more suited to the activities of the group of interests operated by The Ohio Cities Gas Co.

Since that time the various subsidiaries have changed their names and have become **divisions** of THE PURE OIL CO.

The sales policies, products and services of the various divisions have undergone no pronounced change except to enjoy the advantages of greatly enlarged facilities.

THE TEXTILE OIL DEPARTMENT of THE MOORE OIL REFINING CO. DIVISION OFFERS THE BEST VALUES IN DEPENDABLE

COTTON SOFTENERS, EMULSIONS and TEXTILE OILS

THE PURE OIL CO.

THE MOORE OIL REFINING CO.
Division
CINCINNATI, OHIO.

The Moore Oil Refining Co. Cincinnati, O.

GROUND to Fight Friction—
RIGHT in Design—
EFFECT Mill Economy—
INVESTMENT worth while—
SPIN a strong, high quality yarn—
TRUE Traveler Track

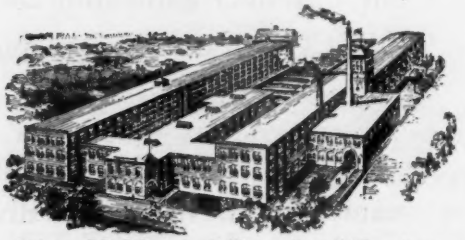
Let Greist Rings ***"make good"*** on your frames

The Greist Manufacturing Company
Precision Manufacturers for 40 Years
Dept. C, New Haven, Conn.

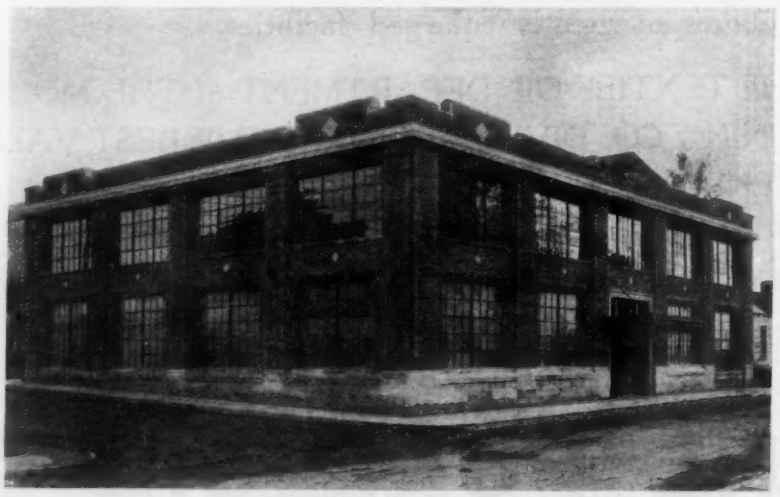
Southern Representative:
The G. G. Slaughter Machinery Co.
Greenville, S. C.

Fall River and New Bedford:
Coldwell Gildard Company
Fall River, Mass.

New England Representative:
Boyd's Textile Bureau,
Butler Exchange,
Providence, R. I.



Ring Holders of Standard Design



New Southern Warehouse

Exclusively for

CROMPTON & KNOWLES PARTS

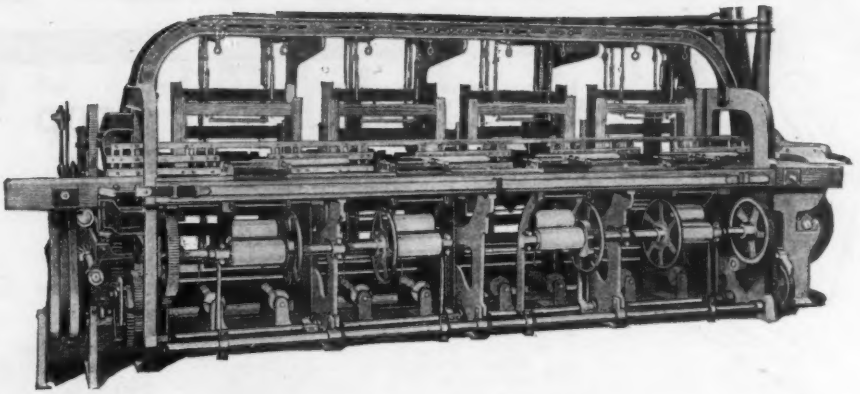
Large Stock Carried — Quick Service

Alexander & Garsed

Charlotte N. C.

Southern Representatives.

FLETCHER
HEAVY WEBBING LOOMS



are the Standard for Weaving Solid Woven Belts and Asbestos Brake Lining.

Never was the time more opportune to survey your weaving machinery equipment and tune it up for high pitch production at the lowest possible cost.

The time for economical production is here. There is no machinery investment you can make which yields so great a return—dollar for dollar—as FLETCHER WORKS (Schaum & Uhlinger) Looms.

These looms are of rigid construction
Are compact and easily operated
Are reliable under all conditions
Are finished with the time, material and labor saving devices for which this house has been noted since 1850.

Our engineers are at your call to help you in a survey of your plant.

FLETCHER WORKS

(FORMERLY SCHAUM & UHLINGER)

Glenwood Avenue, at Second Street, Philadelphia, U. S. A.

Also Manufacturers of

FLETCHER HIGH SPEED RIBBON LOOMS
FLETCHER ELASTIC WEBBING LOOMS
FLETCHER COTTON TAPE LOOMS
FLECHER CENTRIFUGAL EXTRACTORS
FLETCHER MULTICONE CLUTCH

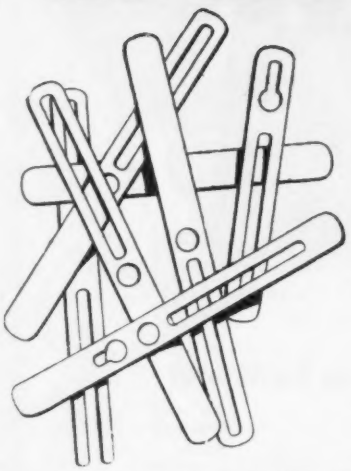
Sales Agents:

THOMAS B. WHITTED
Realty Building
CHARLOTTE, N. C.

R. R. STREET & CO.
28 N. Clinton Street
CHICAGO, ILL.

HURRICANE ENGINEERING CO.
53 State Street
Boston, Mass.

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

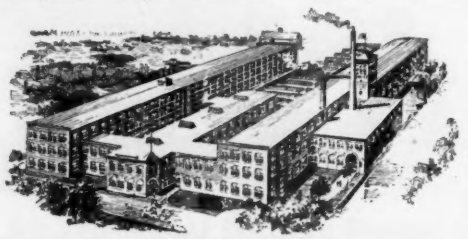
Uniformly made—free from burrs
a reliable source of supply.

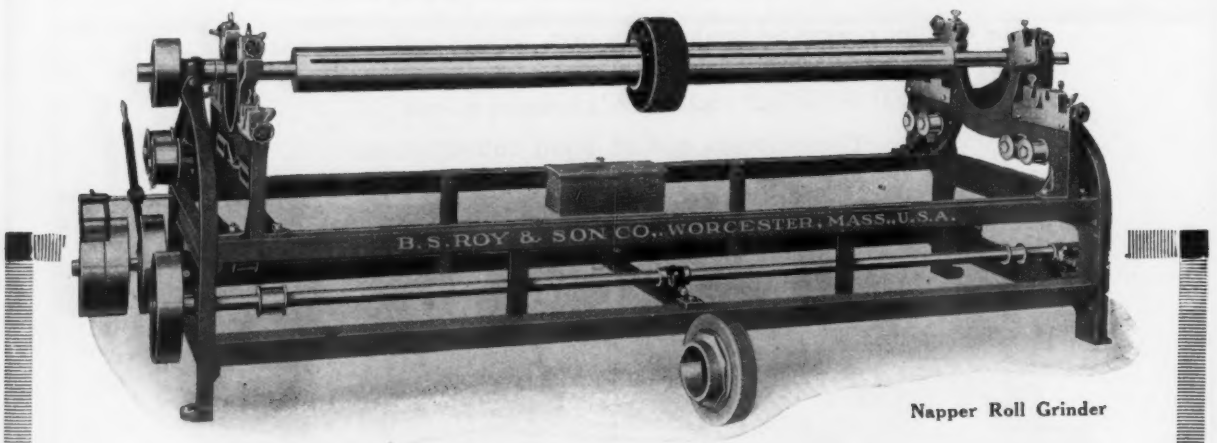
The Greist Manufacturing Company, Dept. C., New Haven, Conn.

New England Representative:
Boyd's Textile Bureau
F. W. Boyd, Manager,
339 Butler Exchange,
Providence, R. I.

Southern Representative:
The G. G. Slaugter Machinery Company,
Greenville, S. C.

Fall River and New Bedford:
Coldwell Gildard Company
108 Hartwell St.,
Fall River, Mass.





Napper Roll Grinder

GET FULL VALUE FROM YOUR NAPPERS

If your Nappers are to produce the proper nap on your cloth, the rolls must be in good condition. This cannot be denied.

The next question is, "How to keep them in good condition." The answer is "By means of a Roy Improved Napper Roll Grinder." This machine represents the highest attainment in the manufacture of such a machine.

Write for full details of Roy Grinders

B. S. ROY & SON CO., Worcester, Mass.

ESTABLISHED 1868

E. M. TERRYBERRY, *Southern Agent*
1126 Healey Bldg., Atlanta, Ga.

Canadian Representative
W. J. WESTAWAY CO. LTD.,
Hamilton, Ontario

STAFFORD

AUTOMATIC LOOMS

For Wide Sheetings

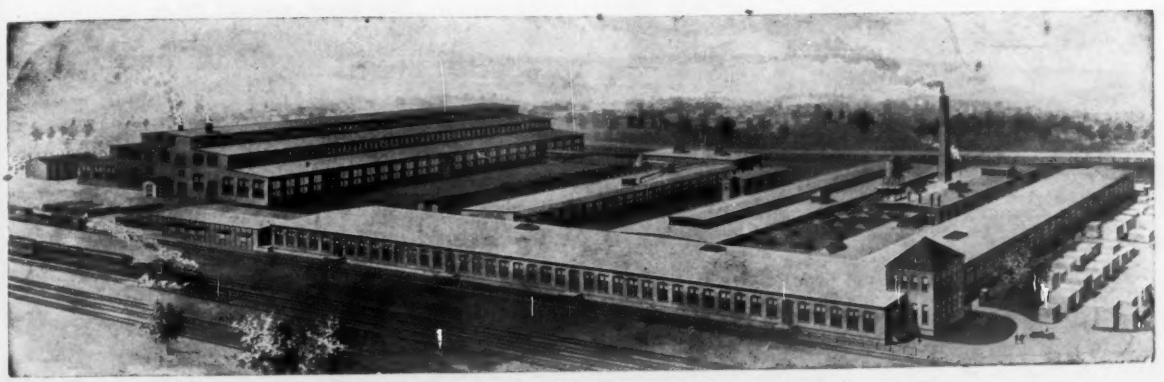
The Stafford broad loom is built to withstand severe service. Its simplicity, accessibility of parts and ease of operation are a few reasons why it is used by some of the most representative wide goods mills.

This loom embodies the high weaving qualities that characterize other Stafford looms and it can now be supplied with either shuttle or bobbin changing automatic features.

THE STAFFORD COMPANY

READVILLE, MASS.

Southern Agent, J. H. MAYES, Charlotte, N. C



PLANT OF THE STAFFORD COMPANY, READVILLE, MASS.

SACO-LOWELL CARD STRIPPER

DUSTLESS AND AUTOMATIC

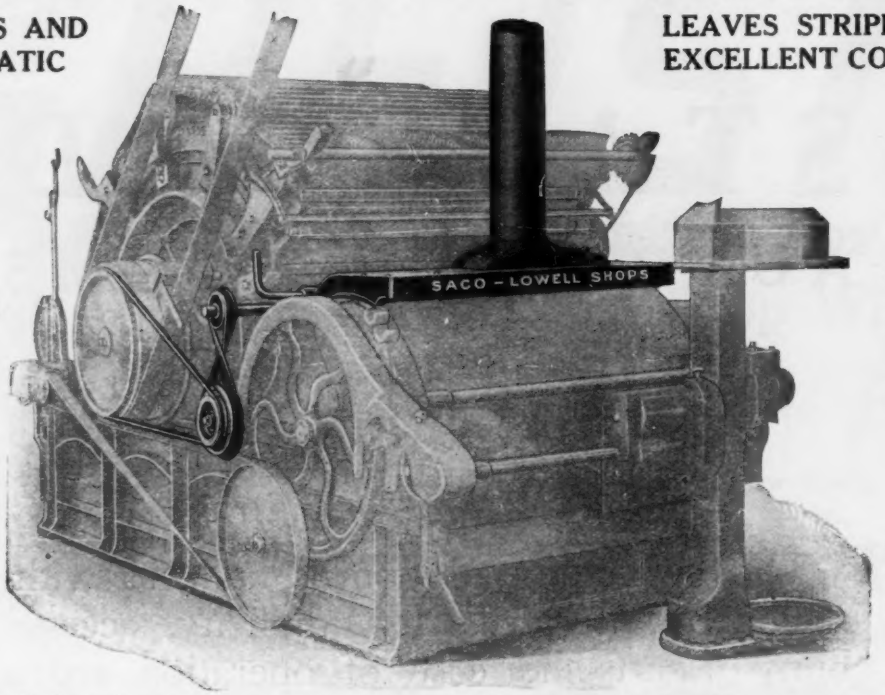
LEAVES STRIPPINGS IN EXCELLENT CONDITION

Economical to Operate

Saves Time and Labor

Strips Card Clean

Sanitary and Efficient



Low Cost of Maintenance

Simple, Durable, Practical

Control Always Absolute

Full Information Furnished

Rogers W. Davis, Southern Agent
CHARLOTTE, N. C.

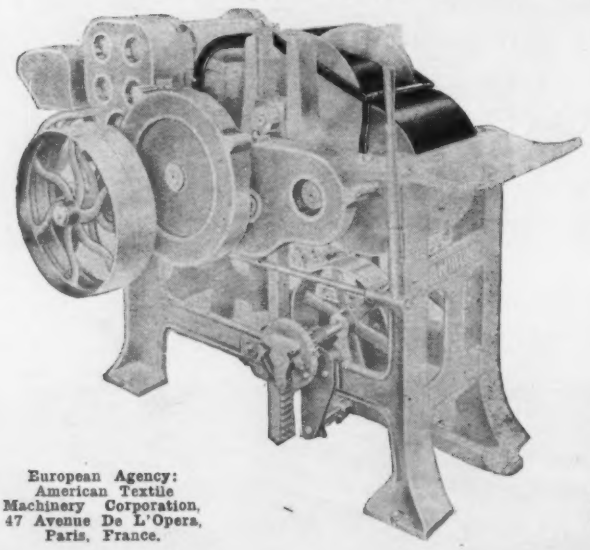
Saco-Lowell Shops, Newton Upper Falls, Mass.

Southern Branch Office
GREENVILLE, S. C.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



"SAFETY FIRST"

Liability of Accident
is Eliminated
by the use of the
Whitin Patented Guard
applied to
Sliver Lap Machines

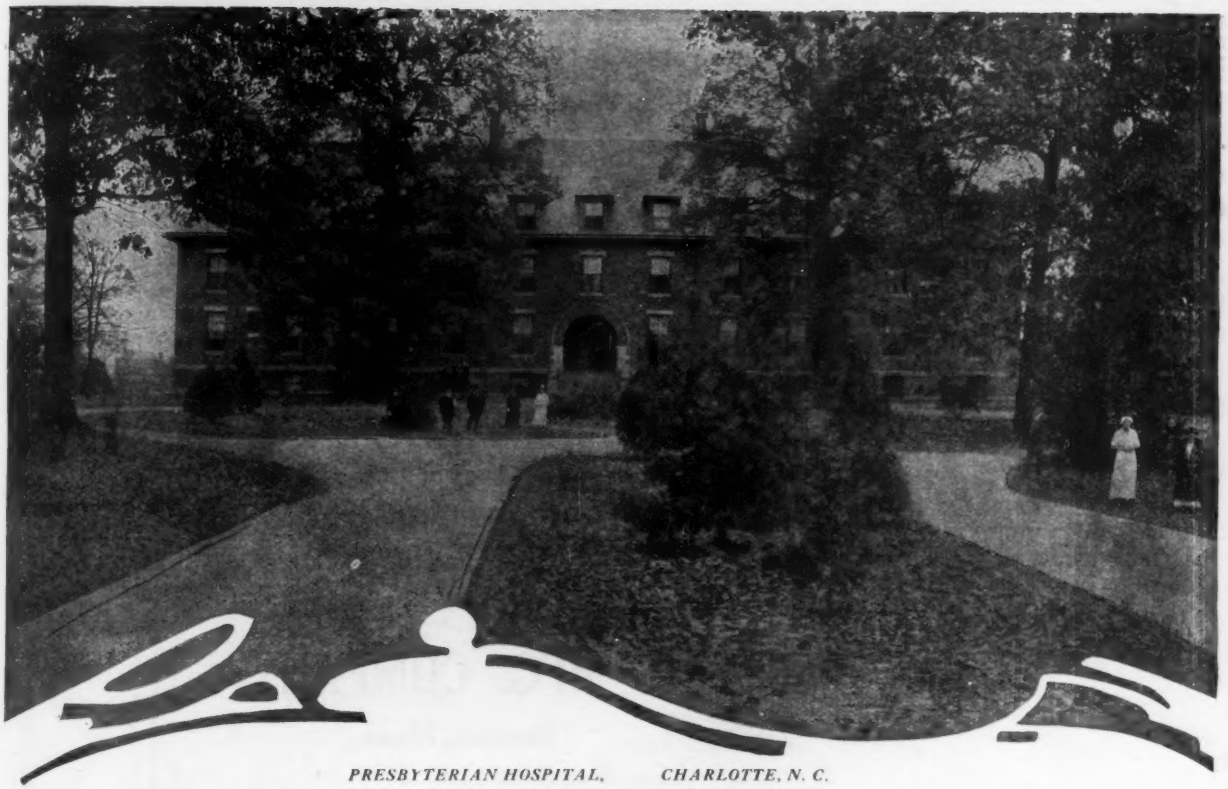
Descriptive Circular on Request.

European Agency:
American Textile
Machinery Corporation,
47 Avenue De L'Opera,
Paris, France.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.



PRESBYTERIAN HOSPITAL, CHARLOTTE, N. C.

MECHANICAL REFRIGERATION IN HOSPITALS AND COMMUNITY STORES

There is no better way to properly refrigerate your hospital and stores, cool milk, make ice, etc., than by installing "SOUTHERN" Ice and Refrigerating Machines.

The value of Mechanical Refrigeration in Hospitals and Community Stores is readily appreciated by textile mills all over the South. "SOUTHERN" Ice and Refrigerating Machines are especially suited for the Community Store, to cool meats, produce and other general supplies.

ECONOMICAL, EFFICIENT AND SANITARY

If the cost of refrigerating by ice exceeds $1.00 to $1.50 per day it will be more economical to use Mechanical Refrigeration. It will be found that the actual saving over the cost of ice will soon pay for the installation of modern Mechanical Refrigerating Equipment, to say nothing of the saving of food products, the longer life of cold storage boxes, and the clean, dry and sanitary refrigeration that will be obtained.

Southern

IMPROVED

ICE MAKING AND REFRIGERATING MACHINES

Write for full information.

SOUTHERN ICE MACHINE CO., CHARLOTTE, N. C.

Manufacturers of ICE MAKING, REFRIGERATING AND WATER COOLING MACHINES

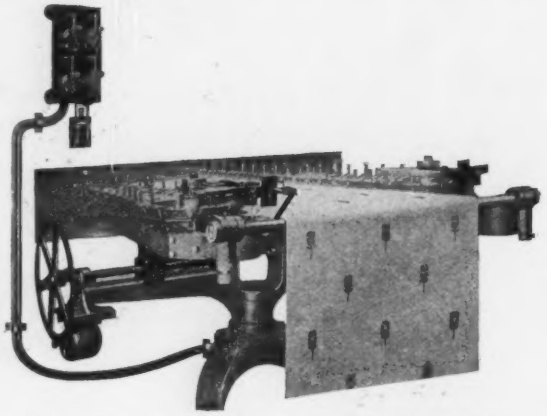
The Schwartz Automatic Electric Guider

(Patented)

for Straight and Swing Tenter Frames

will handle cloth of *any* kind, weight or width

the only guider known for handling fabrics with delicate surfaces, such as velvets, plushes, etc.



Both sides work independently as each is driven by an individual motor, insuring smooth movement of the frame.

The apparatus has few parts, is simple, absolutely reliable and requires practically no attention.

Manufactured and Distributed by

BLAKE ELECTRIC MFG. COMPANY

1 Rowes Wharf, Boston, Mass.

For information write Dept. G.

Your Profits from Cloth Regain Will Pay For this Machine

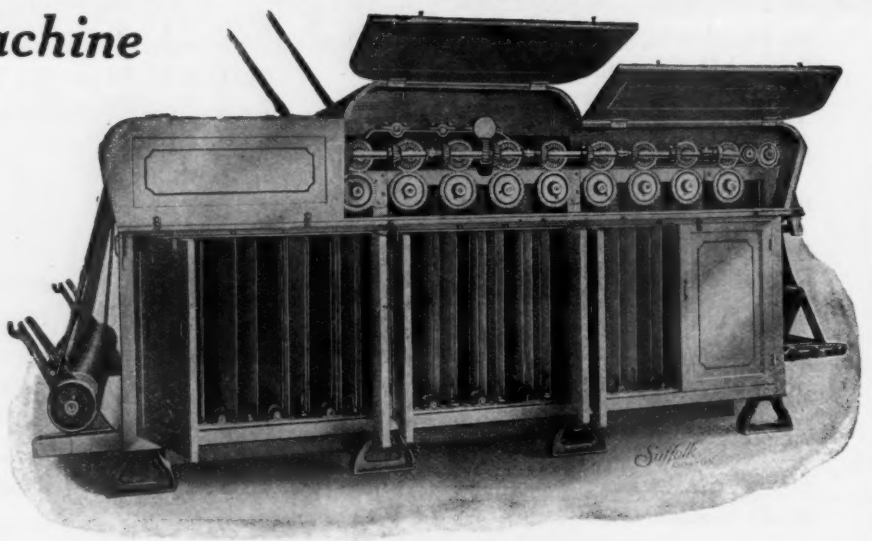
Gains in weight and dimension of your fabrics assured by this process mean enough increased profits from your goods to pay for the machine in a few months operation.

Your product leaves the mill with its normal weight of atmospheric content. Its finish is perfectly uniform with a rich softness that buyers demand.

Let us show you some interesting facts.

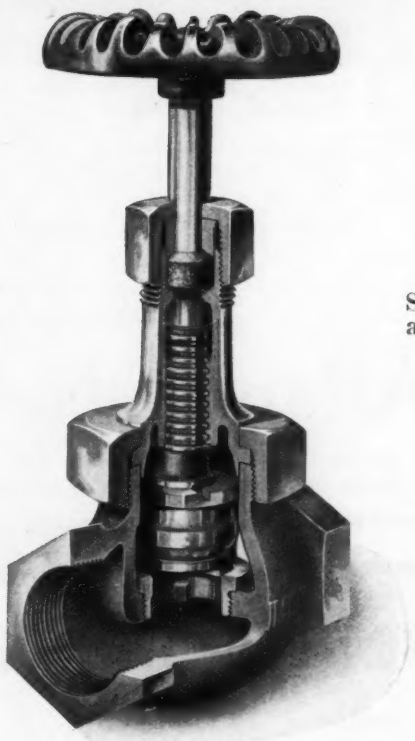
MANUFACTURERS MACHINE CO.

120 Milk St., Boston, Mass.



The MANUFACTURERS COOLING AND CONDITIONING MACHINE

LUNKENHEIMER
"Renewo" Valves



All parts including the "Valve-nickel" Seat-ring and Disc are renewable.

Seating surfaces are regrindable.

Medium Pat., Fig. 73
Extra Heavy, Fig. 16

Specified by engineers seeking the highest degree of efficiency in operation and maintenance because **"Renewo"** service records are proof positive of their unparalleled value for power plant use.

Users realize there is no substitute for **"Renewo"** excellence,—their wear resistance, permanence in the line and low upkeep cost all contributing to economy—the essential to successful plant operation.

The broad scope of the line, including Globe, Angle and Cross, Straightway or Y, and Horizontal and Angle Check Valves, for pressures up to 200 and 300 pounds covers every requirement.

Carried in stock for immediate delivery by Lunkenheimer Distributors situated in every commercial center. Specify **"Renewo"** Valves and insist on getting what you specify.

Write for catalog No. 58-DJ.

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF
HIGH GRADE ENGINEERING SPECIALTIES
IN THE WORLD
NEW YORK CHICAGO **CINCINNATI, U. S. A.** BOSTON LONDON
EXPORT DEPT., 129-135 LAFAYETTE ST., NEW YORK

1-28-10

1895 Oldest National Bank in the Cotton States 1922

The Atlanta National Bank

The Wisdom of Age
With the Vigor of Youth

Such is the happy combination now in the Atlanta National Bank.

SIXTY-FIVE YEARS of successful banking finds the Atlanta National as CONFIDENT of ATLANTA'S FUTURE as when it first opened for business, just after the close of the Civil War and when the city was in ashes.

Its capital investment of ONE HUNDRED THOUSAND DOLLARS has grown to THREE MILLION DOLLARS, and is still growing with Atlanta.

Its recent purchase of additional real estate is to provide added facilities for its patrons.

A COMMERCIAL BANK—PERFORMING EVERY FUNCTION OF A BANK

Seeking new business on its old record.

The Atlanta National Bank

**Active Designated Depository for U. S. Government,
State of Georgia, Fulton County and City of Atlanta**

IF YOU NEED BANKING SERVICE

**in the South,
and especially in Georgia**

You need The Citizens & Southern

*Capital
and Surplus
$4,500,000*

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the South make it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

"No account too large, none too small"

A symbol of satisfactory service

THERE IS A PERSONAL TOUCH in the handling of transactions through this bank that indicates a thorough understanding of what is required and a keen interest in promoting the business interests of our clients.

EXTENSIVE CONNECTIONS in this country and all foreign countries enable us to carry out your wishes and our own in giving you the best of service in any part of the world where banks exist.

Correspondence is invited.

THE NATIONAL SHAWMUT BANK *of* BOSTON

Capital, surplus and undivided profits, $22,000,000.

Here They Are---
Your Expert Laundry Workers

He admitted that he needed an American Mill Village Laundry. The labor situation was bad; wash-days were making serious inroads on production.

But he hesitated.

"The idea is a good one, but where am I going to find a crew of expert operators out here in the hills?"

"Right here in the mill—plenty of them," he replied.

"There's all the raw material we need—give us a few of those girls and a man or two, and in a few weeks we'll give you a skilled force of laundryworkers."

Today his American Mill Village Laundry, in charge of an efficient staff trained by our specialists, is doing all the washing and ironing for a community of several hundred families.

Once a week the mill workers' soiled family linen is taken to the American Mill Village Laundry. It comes back to them clean and beautifully finished.

It is a professional service, scientific, sanitary and clothes conserving. It is an economical service, costing workers less than home washing with its loss of time and wages.

And it is a profitable service, paying this mill a substantial direct return on its investment, and earning handsome dividends in increased efficiency and enlarged production.

It is a service so satisfactory that after a few months' trial, Tucapau Mills of Tucapau, S. C., have ordered a second American Mill Village Laundry for their plant at Gaffney, S. C.

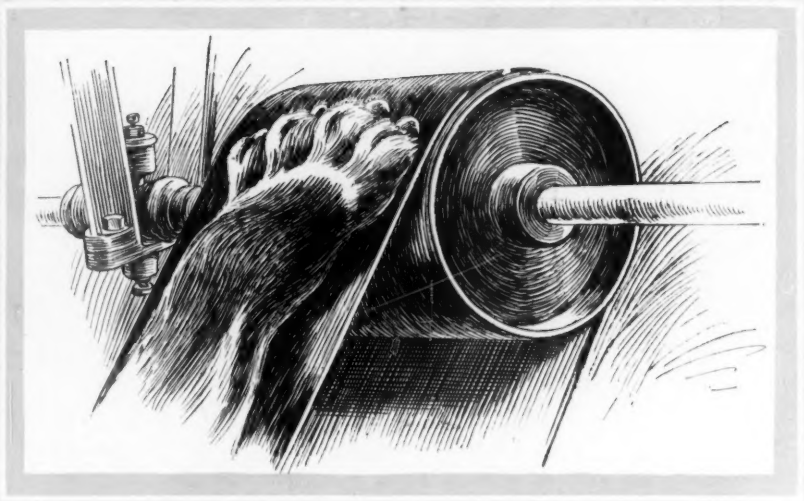
These are positive results which American Equipment and American Service produced for scores of progressive mills.

A line from you today will bring by return mail interesting information showing what this labor-saving, efficiency-promoting plan will do for you.

The American Laundry Machinery Company

Specialty Department C, Cincinnati, Ohio

This composite factory group shows the manufacturing plant of The American Laundry Machinery Company, the world's largest producer of laundry equipment, and originator of the American Mill Village Laundry. The service of this organization is sold with every American Mill Village Laundry installation.

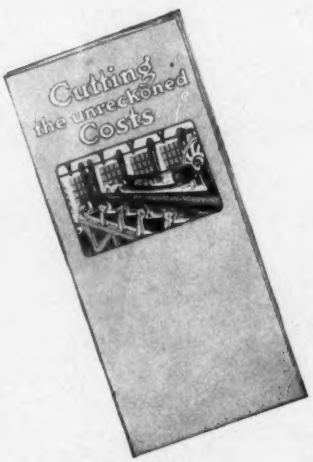


LION PAW BELTING

"runs without dressing"

Manufactured by Buckner Process Co., Inc.

A Grip on Your Power



Lion Paw has a pliable toughness that delivers maximum power and years of endurance. This belt gets its great strength from the looms that weave it—the most powerful ever constructed—and its unusual flexibility from the special weave and internal lubrication.

This booklet contains belting data—comparative tests, charts and other information interesting and valuable to the men responsible for belting economy. A copy will be sent free at your request. Write for it today.

R.D. Skinner & Co. Inc.
70 East 45th Street, New York, N. Y.
70 State Street Boston, Mass.

TOLHURST EXTRACTORS

There's efficiency written in the work of hydro-extraction done by **TOLHURST** machines.

The photograph shows a battery of 40 inch-48 inch **TOLHURST** "Self-Balancing Extractors operating in a well-known New England factory, famous for its output of worsted dress goods.

The initial machine was installed in 1889 and numerous repeat installations emphasize the satisfactory service consistently given.

We should like to tell you about the notable service these machines are doing in this and other mills. And we should like to demonstrate to you the **TOLHURST** Extractor, suited to your exact requirements.

TOLHURST MACHINE WORKS

Established 1852 **TROY, NEW YORK**

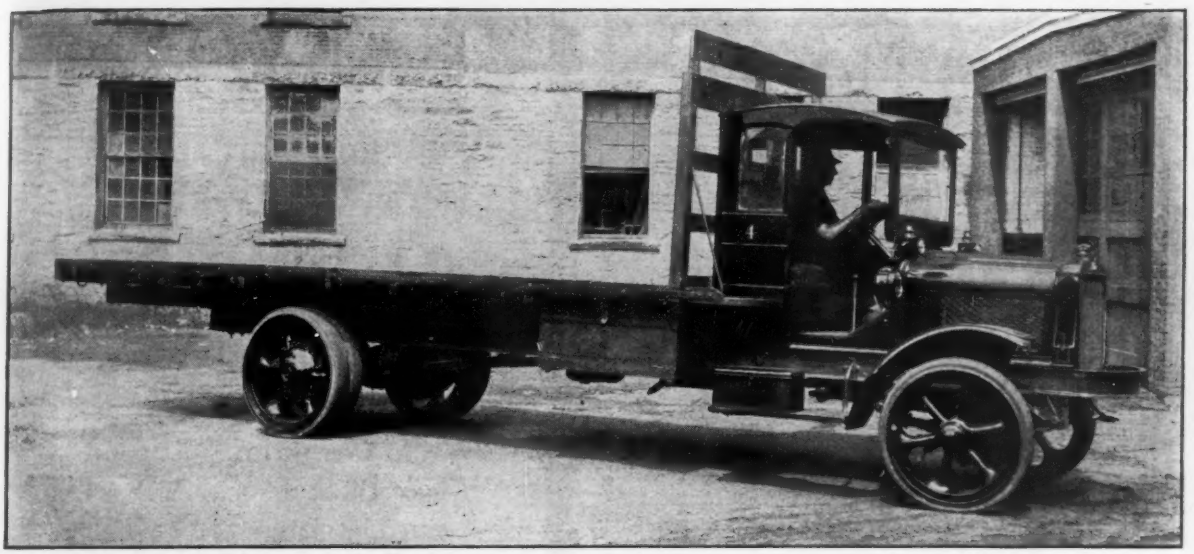
New York Office, 111 Broadway

Southern Rep.:
Fred H. White,
Realty Bldg.,
Charlotte, N. C.

Western Rep.:
John S. Gage,
8 So. Dearborn St.
Chicago, Ill.

San Francisco Rep.:
B. M. Pilhashy,
Merchants Ex. Bldg.,
San Francisco, Cal.

Canadian Rep.:
W. J. Westaway Co.,
Main & McNab Sts., Hamilton, Ont.
400 McGill Bldg., Montreal.



White Truck owned by the Ray Cotton Company, of Boston, Mass.

Hauls Cotton 1300 Miles a Month

"OUR White Truck covers over 1300 miles a month hauling capacity loads of cotton," says Mr. F. L. Cook, Secretary of the Ray Cotton Company, of Boston, Mass. "It is second to none and we believe has few equals in economy of running and repairs."

White Trucks are known everywhere for their ability to give economical service day in and day out, year after year. They continue to operate dependably long after exceeding the usual mileage demanded of motor trucks. One hundred thousand miles has become ordinary performance for a White. Many have gone 200,000 and 300,000 miles, still doing a full day's work. Such mileages have always made a small item of the purchase price—now even smaller with White prices reduced to the 1914 basis.

A list of the owners of 1067 White Trucks having mileage records of 100,000 to 300,000 miles will be sent to anyone on request.

THE WHITE COMPANY
CLEVELAND

White Trucks

MOVING PICTURES

A SPECIAL
DEPARTMENT AT YOUR
SERVICE TO BOOK PICTURES
THAT WILL ENTERTAIN AND
ENLIGHTEN YOUR AUDIENCES

WRITE FOR PRICES AND
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NATIONAL EXCHANGES, INC.

SAVINI FILMS, INCORPORATED
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"THE HOLY BIBLE"
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Neal Hart and
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SERIALS

Released one every week Twelve Fairbanks, eight Harts. The newest product of these stars.

"Go Get Him," "Broadway Buckaroo","A Western Demon, "Hell's Border" the first four titles

FEATTURES

Drop Us a Line for Quotations

Southern States Film Co.
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COMEDIES

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ATTRACTIONS

—THAT WILL—
PLEASE YOU & PLEASE YOUR PATRONS

PICTURES
THAT WILL FILL YOUR THEATRE
FILL YOUR POCKETS
AND FILL YOUR OPEN DATES

Arthur C. Bromberg Attractions
61 WALTON ST., ATLANTA, GA.

We can serve you with

Thrilling Western Features

High Class Comedies

and

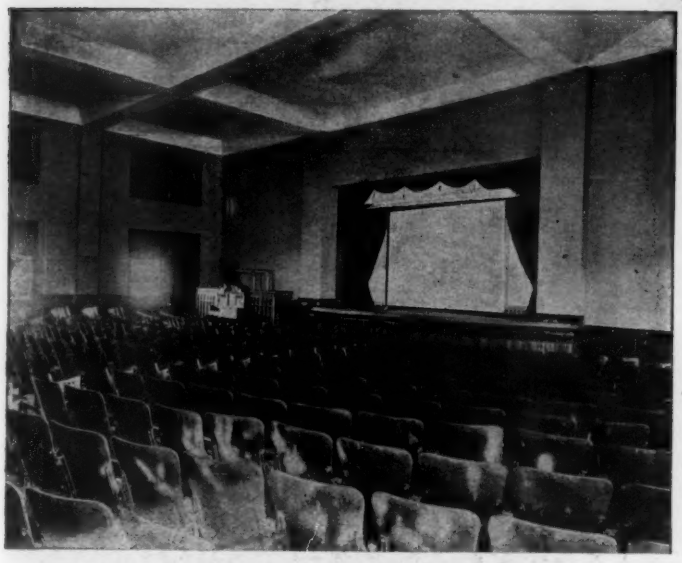
A Big Animal Serial

All we ask is a trial.

Federated Films of Atlanta
146 Marietta St. Atlanta, Ga.

Is Your N
Written Ther

Our service to the textile mills is the res
years of experience in installing textile theatre eq
ment. Our representatives call upon the mills p
sonally, lay out the plans, advise on the prope
equipment required and finally supervise the instal-
lation and the starting of the theatre. In other
words, they take the whole problem off from your
hands and do not turn over the work to you until
the theatre is operating satisfactorily.



A Typical Textile Mill Theatre.

The textile industry is demanding the best moving pictures for their employees and that is why they regularly specify

POWER'S PROJECTORS

That is why more Power's Projectors are used by textile mills in the South than all other projectors combined.

Fi
Union
Hillside Co

Durham Hosiery Mills	
Pamona Mills	
Cleveland Mill & Power Co.	
Rodman-Heath Cotton Mills	
Rocky Mount Mills	
Cherokee Falls Mfg. Co.	Cheroke
Roxboro Cotton Mills	Rox
Consolidated Textile Corp.	Burlin
Carolina Cotton & Woolen Mills	Sp

SOUTH CAROLINA

Baldwin Cotton Mills	Chester
Tucapau Mills	Tucapau
Ware Shoals Mfg. Co.	Ware Shoals
Glenn-Lowry Mfg. Co.	Whitmire
Monaghan Mills	Greenville
Drayton Mills	Spartanburg
Victor Mills	Greer
Conestee Mills	Conestee
Kershaw Cotton Mills	Kershaw
Abbeville Cotton Mills	Abbeville
Chesnee Mills	Chesnee
Union-Buffalo Mills	Buffalo
Victor-Monaghan Mills	Seneca
Victor-Monaghan Mills	Jonesville
Pacolet Mfg. Co.	Pacolet
Aragon Mills	Rockhill
Graniteville Mfg. Co.	Vanciuse
Woodside Cotton Mills	Greenville
Orr Cotton Mills	Anderson
Issaqueena Mills	Central
Clifton Mfg. Co.	Clifton
D. E. Converse Co.	Glendale
Winnsboro Mills	Winnsboro
Monarch Mills	Lockhart

We carry a complete line of supply parts and equipment at our various branches. Your orders for supply parts will be filled the same day the order is received. Whatever are your needs for your theatre, we can supply them.

We have a special offer for the Textile Mills. May we present it to you?

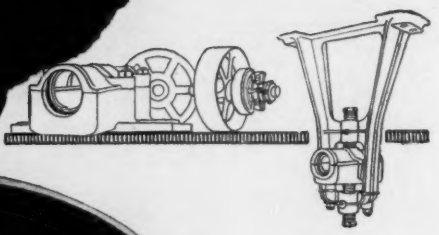
Southern Theatre Equipment Company

WILLIAM OLDKNOW, President,

No. Nine Nassau St.
ATLANTA, GEORGIA

THREE TWENTY-EIGHT CALIFORNIA ST.,
OKLAHOMA CITY, OKLA.

Eighteen Fifteen Main St.
DALLAS, TEXAS



BY INVITATION MEMBER OF

BE GUIDED BY THIS FOUNDATION

STRENGTH HONOR QUALITY SERVICE

PRICE LEADERS OF THE WORLD ASSOCIATED

NEW YORK, U.S.A.

IN THE FINAL ANALYSIS——————CAST IRON PULLEYS

Have you ever thought of the pulley troubles you have had and how invariably the drive was made satisfactory by installing Cast Iron pulleys—either supplanting pulleys of some other type or by changing to cast iron pulleys of suitable construction?

BUT IT WAS A CAST IRON PULLEY THAT FINALLY STOOD UP UNDER THE SERVICE.

Almost every user of power has had this experience and always the solution of continuously satisfactory transmission service has been the installation of cast iron pulleys.

The use of cast iron pulleys in the initial installation will prevent trouble.

T. B. WOOD'S SONS COMPANY, Chambersburg, Penna.

Milton G. Smith, Southern Sales Agent, Greenville, S. C.

POWER TRANSMITTING MACHINERY

A Sure Way to Reduce Your

BELTING COSTS

COCHECO TRADE MARK BELTING

COCHECO

BELTING

Quality Belting Since 1842

Of course, you can't reduce *initial* belting costs without sacrificing quality; but you *can* reduce the *actual cost*, figured on length of service per dollar invested—by equipping your plant with *Cocheco Belting*. The continually increasing demand for this product proves beyond a doubt that investigation and comparison eventually lead to its selection.

Cocheco Belting lasts longer, gives maximum power transmission, and is the toughest and most economical for all purposes. Every inch is taken from the center part of large heavy butts, and is pure oak tanned. From the small 3 inch belting for light work to the 40 inch double belting for main drive, the *"Cocheco" Line* includes a belt for every known use. Start today to economize. Let us tell you more about Cocheco Belting.

I. B. WILLIAMS & SONS

Dover, New Hampshire **U. S. A.**

14-16 N. Franklin St. Chicago, Ill.

71-73 Murray St. New York, N. Y.

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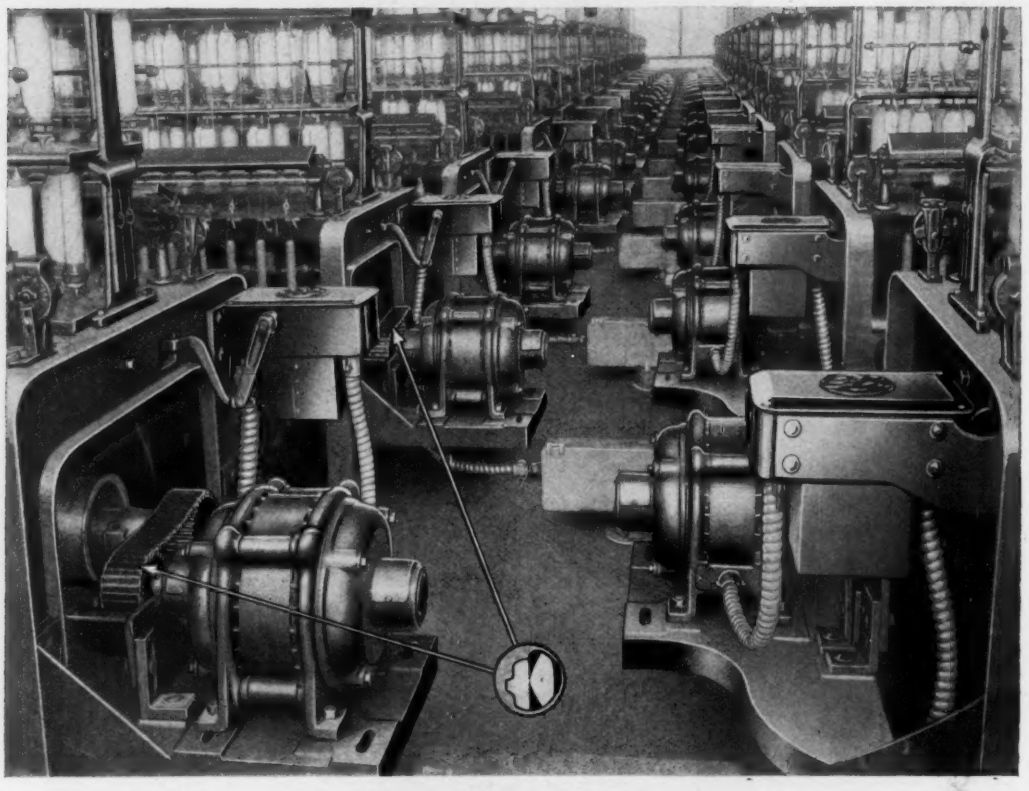
MORSE SILENT CHAIN DRIVES

THE MORSE "ROCKER JOINT"



Efird Mill No. 4.

Installation made in 1916

In equipping No. 5 mill in 1920 Morse Chains were specified.

the following are the results being obtained:

(1) Higher and positive front roll speed.
(2) Uniform twist.
(3) Fewer ends down.
(4) Better lighting and decreased fire risk through elimination of belts.
(5) Decreased labor cost, one operator being able to handle more sides.

Write Today for Free Booklet
Benefit by Morse Service as others do.

MORSE CHAIN CO., LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD **ITHACA, N. Y.**

Morse Engineering Service *Assistance Without Obligation*

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BOSTON, MASS.....141 Milk St.
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
CHICAGO, ILL.....Merchants L. & T. Bldg.
CLEVELAND, OHIO.....Engineers Bldg.
DETROIT, MICH.....Cor. 8th and Abbott Sts.
KANSAS CITY, MO.....Finance Bldg., Morse Engr. Co.
NEW YORK CITY.....50 Church St.
PHILADELPHIA, PA.....Fuller Bldg.
MINNEAPOLIS, MINN....413 So. 3rd St., Strong-Scott Mfg. Co.
PITTSBURGH, PA.....Westinghouse Bldg.
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ST. LOUIS, MO.....Chemical Bldg., Morse Eng'rg Co.
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"Morse" is the Guarantee always Behind the Efficiency, Durability and Service

WE are manufacturers of about 20,000 articles, including

VALVES,
PIPE FITTINGS,
STEAM
SPECIALTIES,

made of brass, iron, ferrosteel, cast steel and forged steel, in all sizes, for all pressures and all purposes, and are distributors of pipe, heating and plumbing materials.

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CRANE-BENNETT, LTD. — LONDON, ENG.

You are cordially invited when in Atlantic City to make the Crane Exhibit Rooms (1105-1107 Boardwalk) your headquarters. We will be glad to receive any mail addressed to you in our care.

FLORIDA TRAINS

Via

SOUTHERN RAILWAY SYSTEM

SUWANEE RIVER SPECIAL
To the
WEST COAST OF FLORIDA

Lv Atlanta	*(CT)*	*11.45 AM*
Lv Macon	*(ET)*	*3.20 PM*
Lv Cordele		*5.15 PM*
Lv Tifton		*6.23 PM*
Lv Valdosta		*7.45 PM*
Lv Hampton	*(SAL)*	*11.45 PM*
Ar TAMPA, Fla.		*5.55 AM*
Ar BRADENTOWN, Fla.		*7.25 AM*
Ar SARASOTA, Fla.		*8.00 AM*

SLEEPING CARS DINING CAR COACHES
SOLID THROUGH TRAIN, VIA
MACON, VALDOSTA, HAMPTON

KANSAS CITY-FLORIDA SPECIAL
To
JACKSONVILLE and Other
FLORIDA Cities

Lv Atlanta	*(CT)*	*9.45 PM*
Lv Macon	*(ET)*	*1.15 AM*
Ar JACKSONVILLE, Fla.		*8.45 AM*

SLEEPING CARS COACHES
DINING CAR FOR BREAKFAST
SOLID THROUGH TRAIN VIA MACON AND JESUP

DAY TRAIN To FLORIDA
Via MACON and VALDOSTA

Lv Atlanta	*(CT)*	*7.50 AM*
Lv Macon	*(ET)*	*12.25 PM*
Ar Cordele		*2.35 PM*
Ar Tifton		*4.15 PM*
Ar Valdosta		*5.48 PM*
Ar JACKSONVILLE, Fla.		*9.50 PM*

THROUGH DAY TRAIN ATLANTA TO JACKSONVILLE VIA MACON AND VALDOSTA. OBSERVATION PARLOR CARS. (THROUGH COACH ATLANTA TO BRUNSWICK VIA MACON AND JESUP.)

ROYAL PALM
To
JACKSONVILLE and Other
FLORIDA Cities

Lv Atlanta	*(CT)*	*8.55 PM*
Lv Macon	*(ET)*	*12.30 AM*
Ar JACKSONVILLE, Fla.		*7.55 AM*

SLEEPING CARS COACHES
SOLID THROUGH TRAIN VIA MACON AND JESUP

OHIO SPECIAL
To
JACKSONVILLE and Other
FLORIDA Cities

Lv Atlanta	*(CT)*	*11.35 PM*
Lv Macon	*(ET)*	*3.15 AM*
Ar Cordele		*5.23 AM*
Ar Tifton		*6.37 AM*
Ar Valdosta		*8.00 AM*
Ar JACKSONVILLE, Fla.		*11.30 AM*

SLEEPING CARS COACHES
DINING CAR FOR BREAKFAST
SOLID THROUGH TRAIN VIA MACON AND VALDOSTA

ATLANTA-JACKSONVILLE EXPRESS
To
JACKSONVILLE and other FLORIDA Cities

Lv Atlanta	*(CT)*	*7.45 PM*
Lv Macon	*(ET)*	*11.20 PM*
Ar Valdosta		*4.10 AM*
Ar JACKSONVILLE, Fla.		*8.00 AM*

SOLID THROUGH TRAIN. SLEEPING CARS ATLANTA TO JACKSONVILLE AND ATLANTA TO VALDOSTA; MACON TO JACKSONVILLE. COACHES.

For TICKETS and RESERVATIONS:

CITY TICKET OFFICE
BROAD & WALTON STREETS, ATLANTA, GEORGIA
'PHONE IVY 1961

DEVRIES DAVIS, *City Tick. Agt.* V. L. ESTES, *Dist. Pass. Agt.*

TUPELO

("THE HARD-WEAR") LUMBER

Tramp! Tramp!! Tramp!!!

go the feet on a TUPELO FLOOR, and that floor seems to—and actually does—grow smoother, because of Tupelo's "involved" or closely "knitted" grain which prevents slivering or splintering and *reduces the wearing.*

Roll! Roll!! Roll!!!

go the truck wheels over the TUPELO FLOOR in a Textile Mill, a Warehouse or on a Platform where the wear from truck wheels is constant and severe. These are the uses where

Tupelo Stands the Gaff

and refuses to wear down—or out.

Tupelo is *Made* for Hard Wear

If you're going to lay a floor, or have one laid, you want the whole "TUPELO tale." We know it "by heart" and will be glad to tell it.

Will you kindly write and ask for the particulars? Address,

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

805 Poydras Building, New Orleans, La., or 805 Graham Building, Jacksonville, Florida.

(Please address office nearest you)

··· Paints for All Industrial Needs ···

A Third More Daylight For Production and Profit

Much of the money spent for artificial light in Textile Mills can be saved by OJACO Mill White.

Applied to walls and ceilings, the snowy-whiteness of OJACO Mill White will light up the dimmest part of your plant. Dark, neglected corners will be made productive and profitable.

OJACO Mill White adheres closely to surfaces wherever applied. It will not crack or peel under the most severe vibrations. It obviates the necessity of frequent repainting because it can be renewed by washing or scrubbing. It is as economical as it is effective in increasing your supply of daylight.

There's an OJACO distributor near you. Get in touch with him. Ask him to send one of his men to give you further particulars.

OLIVER JOHNSON & CO., INC., Providence, R. I.
Paint Makers

MILL-WHITE

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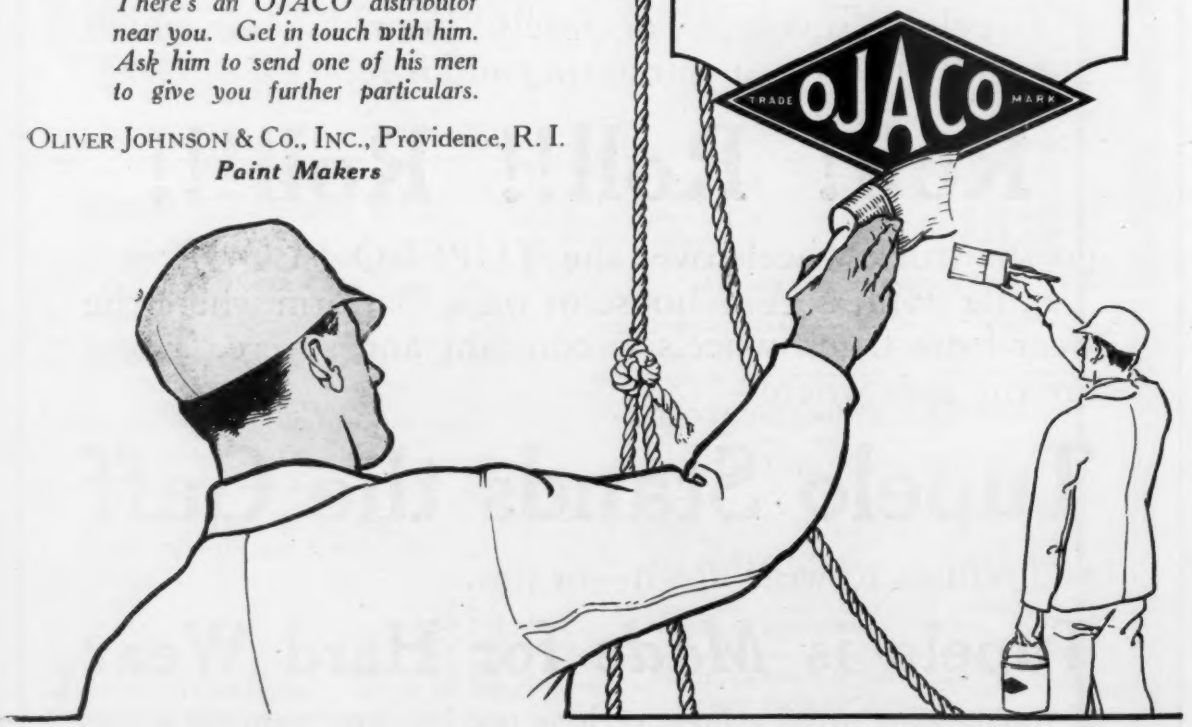
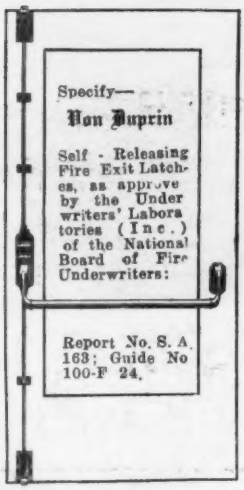


Von Duprin

Self-Releasing Fire Exit Latches


Specify—
Von Duprin
Self - Releasing Fire Exit Latches, as approved by the Underwriters' Laboratories (Inc.) of the National Board of Fire Underwriters:
Report No. S. A. 163; Guide No 100-F 24.

Continuation School, Milwaukee, Wis.

Van Ryn & De Gelleke, Architects, Milwaukee.

SECURITY

Any device designed for safe exit in time of emergency must, if it is to be satisfactory, afford security for the contents of the building as well as safety for the inmates.

Von Duprin Self-Releasing Fire Exit Latches do both.

They may be left either locked or unlocked from the outside, but when locked they make entrance impossible except by breaking down the door. Yet, locked or unlocked, they will always release the door instantly when anyone inside the building presses the cross bar.

Let us send you Catalog 12-T, and the new booklet, "Saving Lives."

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

STEIN CO. WAREHOUSE, ATLANTA, GA.
LOCKWOOD & POUNDSTONE, ARCHITECTS

THIS STRUCTURE PROVES THAT UNDER THE DIRECTION OF A WELL-ORGANIZED AND THOROUGHLY EQUIPPED CONTRACTOR, THE BEST OF WORKMANSHIP MAY BE ATTAINED ALONG WITH EXTRAORDINARY RAPIDITY AND ECONOMY OF CONSTRUCTION.

THE FOUNDATION COMPANY

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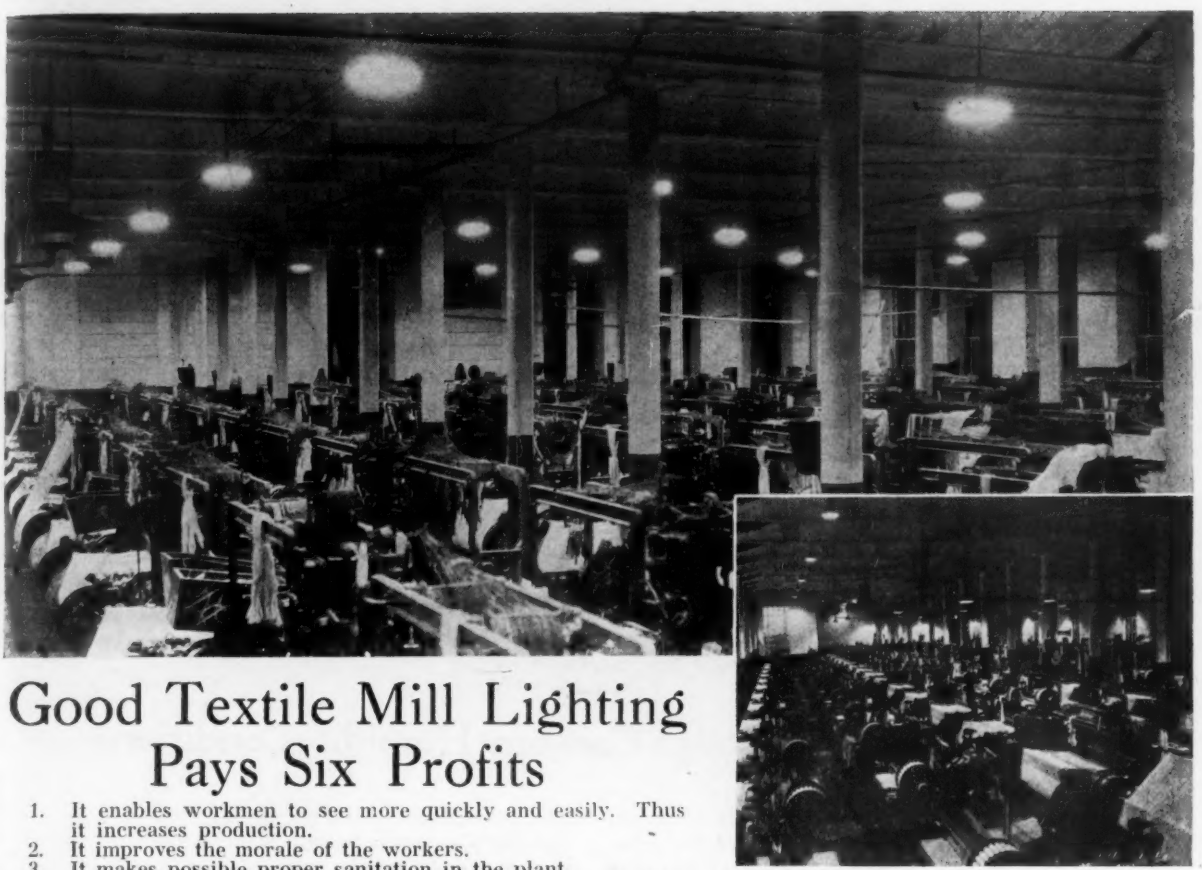
DETROIT	VANCOUVER, B. C.	TAMPICO, MEXICO

BUILDERS OF SUPERSTRUCTURES AS WELL AS SUBSTRUCTURES



Good Textile Mill Lighting Pays Six Profits

1. It enables workmen to see more quickly and easily. Thus it increases production.
2. It improves the morale of the workers.
3. It makes possible proper sanitation in the plant.
4. It enables workmen to see when machines are running idle.
5. It decreases spoilage—often as much as 50%.
6. It prevents many minor accidents.

Good textile mill lighting pays for itself on any one of these six counts. And this sextette of profits makes lighting an important asset—not an expense, but an investment that pays handsome dividends.

Many mills in every textile center have solved their lighting problems with IVANHOE RLM reflectors equipped with bowl enameled MAZDA lamps. In your own mill, IVANHOE reflector equipment will direct your light on the working plane where you want it; will give you value received for every dollar you pay for current; will, indeed, enable you to make a greater net profit during 1922.

If you would know the facts about your lighting, write to our distributor nearest you, or direct to us.

IVANHOE-REGENT WORKS of General Electric Co.
Cleveland, Ohio

"Ivanhoe" Steel Reflectors, Lighting Glassware, Anderson Self-Adjusting Arms, and Illuminating Service.

Two unretouched photographs of the same weave room in a southern cotton mill. The insert shows the poor lighting that was—inefficient and expensive; the larger one, the good lighting that is—a modern and economical installation of IVANHOE RLM reflectors and bowl-enameled MAZDA lamps.

"SERVICE TO LAMPS"

IVANHOE

GLASS SHADES - STEEL REFLECTORS

53000 Ring Spindles
12000 Twisting Spindles
23's and above

Fitchburg Yarn Co.
Fitchburg, Massachusetts

Improving Yarn through Constant Humidity Conditions

Making Yarn for other people means that uniform product gets a lot of consideration. Making yarn for other people is not only a study in manufacturing but a study in service. Often yarn that is made in January isn't used until March. Made in January it must be satisfactory in March. More than that, it must be like the product that was used last June.

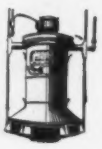
You can take all the care you will in the niceties of yarn manufacture—but if you eliminate consideration of constant humidity conditions, you are leaving out of the equation the greatest variable.

But if you reckon this as one of the factors of your problems, you and your customer can talk the same language. The yarn you made in January and he uses in March will be talked about in terms of regain and weights and counts—and quality.

You as a manufacturer, maybe, can control the size of your yarn. Regain, and thus the weights, the counts—and the quality—are all influenced by humidity. If humidity is constant, what shall we expect, having removed the greatest variable?

Constant humidity conditions are not only commercially practicable—the want of them causes most of the kicks and adjustments.

Why don't you ask the Fitchburg Yarn management what a study of humidification needs and the installation of a modern ParkSpray apparatus—automatically controlled—did for them? They had a humidifying system of well known make. But it was installed in 1905—and since 1905 there has been a lot of data classified and tabulated. Maybe it's only waiting in a pigeonhole for you. And then you could profit too!



Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte

COTTON

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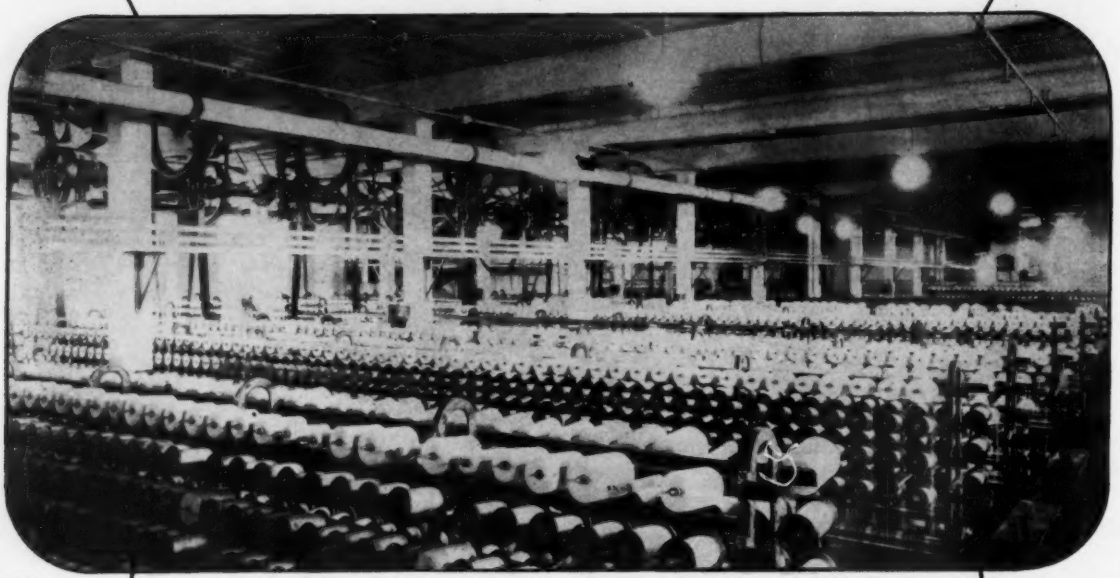
Cutting the Cost of Spinning and Twisting

Here are eleven of the forty new Hyatt roller bearing equipped heavy twister frames made by the Whitin Machine Works on specification for the Fairhaven Mills of New Bedford, Mass. Tests on Hyatt equipped Whitin spinning frames indicate that these twister frames will save ½ HP or $20.00 per year per frame, considering the power saving alone.



USE HYATT BEARINGS ON YOUR LINE SHAFTS TOO BULLETIN 125

Hyatt Replacement Boxes A Fine Investment

To obtain the savings made possible by Hyatt bearings on spinning and twister frames it is not necessary to wait until new machines are needed.

The use of Hyatt bearing replacement boxes as made by the Whitin Machine Works and other prominent manufacturers is a simple method of applying Hyatt bearings to your present frames so that you can begin to secure the operating economies at once.

The Whitin Machine Works' test and our test showed a power saving in favor of Hyatt bearings of slightly more than ½ HP per frame. This represents a saving of $20.00 per frame per year.

As the approximate cost of Hyatt replacement boxes is only $35.00 per frame it is apparent that the bearings will pay for themselves in power saving alone in 21 months. Being durable they'll save $20.00 per frame per year throughout the life of the machines without adjustment or replacement.

The lubrication savings when Hyatt bearings are used are also important. The best plain bearings on spinning and twister frames require oiling once a week. Hyatt equipped frames will operate properly if oiled only three to four times a year.

The yarn produced on a Hyatt equipped machine is uniformly spun or twisted, due to the more uniform spindle speed, because of the smooth running cylinder shafts.

Specify Hyatt bearings for new textile machinery and apply them to your present equipment—it pays.

Hyatt Roller Bearing Company, New York, N. Y.

With the Publishers—

Some Reasons Why Mill Men Read COTTON

The superintendent of a Georgia mill conceived a device to overcome the careless and uneven feeding of cotton in the breaker pickers. He experimented with his device and perfected it. Then he attended a sectional meeting of the carders of the Southern Textile Association at Columbia, S. C., and told those present of what he had accomplished. He further advised that the device was not patented and that any carder wishing to utilize it was welcome to do so.

Attending this meeting was one of the editors of COTTON. He realized at once the value of the device to the smaller mills that were not provided with automatic feeders on these machines and immediately arranged with this superintendent to prepare an illustrated description of the attachment for COTTON's department entitled, "How Other Men Manage." The letter on "A Thin Lap Preventer for Breaker Pickers," in the October, 1921, number was the result.

In the same department last month was published a letter from the superintendent of a North Carolina mill thanking the Georgia man for his idea as presented in COTTON and illustrating and describing a change in detail on the original device intended to make it more convenient for the operative. In describing the results obtained from the use of the device in his mill, this superintendent said:

> "I feel that 'J. H. Y.' has made a wonderful discovery for we have had a great deal of trouble with our breaker laps varying from three to eight pounds. I don't mean to say that the weights would vary eight pounds if the attendant would keep the hopper full all the time, but experience has shown that an attendant will fill the hopper and then walk off or sit down and leave the machine to make an even lap. This, of course, is annoying and makes it very hard for the finisher man to keep his weights correct even though the evener motions may be doing their work as satisfactorily as they were designed to do. The point is this: if even laps are supplied to the finisher, even laps would be made, provided the machine was not a piece of junk being used to make finished laps.
>
> "We have installed two of these devices, one on an Atherton breaker and another on a Whitin breaker, and the lap weights do not vary over two pounds—with the hopper full and with the hopper one-fourth full—and the number of laps set back to be run over has decreased from about twenty or thirty to practically none. In fact, this little appliance might well be termed 'The Finisher's Friend,' and its worth cannot be fully described."

Further comment is unnecessary as the foregoing speaks for itself.

In the same department of the present number the superintendent of a successful South Carolina mill tells how he increased the production of his carding and drawing equipment ten per cent without changing either the speed of the machines or the weights of the picker laps and card slivers.

Another article in this issue that will appeal to the practical mill man is on "Good Running Work and How to Secure It." This article is also written by a successful mill superintendent and contains hard practical facts that cannot be overthrown by mere discussion.

These illustrations are cited merely as high lights in the general picture of COTTON's monthly contents. The list might be continued to great length without changing the perspective from the reader's viewpoint. The lesson to be drawn focuses down to the principal factors of successful manufacturing—increased production, improved quality, reasonable costs.

Business Papers as Advertising Mediums

It was stated recently in *Dress Essentials* that "in the entire country there are less than 10,000 so-called national advertisers. Would it astonish you to learn that there were in 1915 160,000 advertisers in trade and technical papers? *How many more there are now we do not know. . . . .*

"Bear in mind that these thousands of advertisers are using papers with five and ten thousand circulations. There may be some who have allowed the glamor of big general circulations to blind them to the concentrated buying power of the average business-paper reader.

"A certain business paper has completed an investigation of the financial ratings of their subscribers as given by R. G. Dun & Co. The average was found to be $297,668 668.

"The buying power of the readers is what counts, not the number of them. . . . . The thousands of advertisers in business papers are there for one reason only—they get results.

"Even poor copy, and there is some of it, brings results, because of the brute power of the mediums and the lack of waste circulation. The average business paper is regarded almost with affection by its regular readers. They read it even when they have not time for other kinds of reading.

"It concerns their bread and butter, and the thing which occupies their minds during most of their waking hours.

"The advertising commands as much attention as the editorial contents. Frequently it is read first and most closely. Everything from cover to cover concerns the business of the reader, the biggest thing in his life. There is nothing to distract or divert his interest. What a wonderful advertising medium for those who learn how to use it!"

If your problem is to reach the textile mills, talk directly to the mill men in their own language, about their own business, in their own papers.

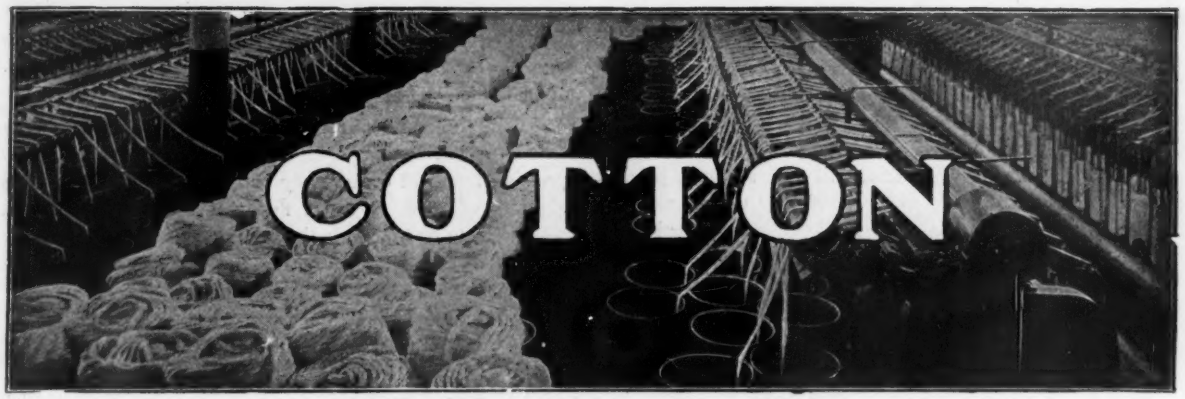
COTTON is America's largest textile monthly.

AMONG COTTON'S READERS

A. E. Yates, President
Yates Bleachery Company
Flintstone, Georgia

"I look forward with much pleasure to the arrival of each issue of COTTON and could suggest no better Christmas gift than a year's subscription to COTTON for anyone interested in textile manufacturing."

A. E. Yates



February, Nineteen-Twenty-Two

The Shadow of Politics.

This promises to be a year in which the American business man will wish he lived under a government that had no elections. For the Congressional campaign has already cast its shadow over the legislative halls at Washington and the grist of Congress shows the effect of campaign influence.

It is in the nature of political things that Congressmen should worry about their re-election. They are only human and it is difficult to expect them to resist the pressure exerted upon their judgment by their hopes of a favorable result on November 7.

In political parlance, this is an "off" year in elections—the year of Congressional election changes midway between Presidential campaigns. As a general rule, these off-year campaigns are not violent nor is their reaction felt deeply by the business world. In previous campaigns of the sort, the plow has not gone deep and business has barely felt the effect of the struggle for Congressional domination.

But the world of business, of industry, commerce and finance, is peculiarly sensitive this year. Conditions at home and abroad react more quickly than they did in times of greater stability. For that reason the campaign threatens to have a most vital influence on the trend of the nation's business. Congress still has important work to do. A survey of its labors since the Harding administration took charge last March reveals a lot of things that have not been done. Had it been possible to push these to a solution last Summer, Congress might have handled them with a little more attention to their actual merit and a little less attention to their effect on the voters next November.

Now the average Congressman votes with both eyes on his constituents; with an ear to the ground to hear the slightest rumble from his home territory.

"Uncle Joe" Cannon put this rather effectively a good many years ago when he said that the trouble with these statesmen was that they kept an ear on the ground so long that the bugs crawled in, and they thought it was the voice of the people. He also declared that a lot of statesmen were so worried by their fears that they might overlook some desire of their constituents that they got both ears on the ground.

"There are only two kinds of animals that can do that" —added the former czar,—"jackrabbits and jackasses."

The news from Washington indicates that a lot of Congressmens' ears are on the ground. It is easy to trace the effect of this worry about the result of next Fall's election in the maneuvers on the proposed revision of the tariff. The House of Representatives passed a permanent tariff bill last Summer. The Senate is still wrangling over it. When it gets through, the House will have to take another crack at it, for things have changed mightily, both here and in foreign lands, since the House wrote the Fordney bill. Originally, it was in the cards that this measure would become known as the Fordney-Penrose tariff act of 1922. Now it will be known as the Fordney-McCumber act, for the Pensylvania Senator is dead and the North Dakotan who sat next to him at the Finance committee table has risen to its chairmanship.

Senator McCumber is also a candidate for re-election next Fall and it would be flattering him too much to say that that fact has no influence on his votes. But he is not the political leader that his predecessor was. His vote will have little influence on the votes of others. As a member of the farmers "bloc" of the Senate he may even find himself aligned on the opposite side from many of his Republican colleagues. But the fact that this is a campaign year is giving the farmers bloc an extra bit of leverage in bringing the Republican party to its terms.

Besides the tariff, the item of legislation that will reveal more clearly the effects of the campaign is that of the soldiers' bonus. A year ago the Harding administration might almost have dodged this issue. Now it has found itself forced to favor this legislation. For the "soldier" vote is looked upon by the party leaders in Washington as a vital factor in the elections. The difficulty from the beginning of the whole soldiers' bonus idea has been the fact that there is no money available to pay it. The tax revision bill last Fall succeeded in paring down a little from the old war-time taxes but left no surplus to invest in soldier compensation.

As a result, there has been a search for fields in which money might be harvested without the taxpayers knowing it. Such fields are scarce. The sales tax to pay a soldiers' bonus might cost as many votes as it would earn. The proposal to restore the consumption of light wines and beer as a medium for bonus taxation, had manifested too many prohibition enemies to be feasible.

This left the foreign war loans of the government as the only point at which money might be found in sufficient quantities to help liquidate a bonus that would cost more

than a billion dollars. Even this field did not promise to be fertile. The foreign loans would have to be collected before the soldiers could spend them. The collection of these loans, in the present condition of the world's finances, seemed anything but a rosy prospect.

For the administration, there was one advantage in this conjunction between the bonus bill and the foreign debt problem, in that it offered the possibility of using the influences behind the bonus to force Congress to give the Treasury Department power to refund the foreign loans. The administration had sought this power ever since last Fall, but Congress had declined to grant so important an authority to the treasury. If the friends of the bonus would get behind the refunding bill, the administration would at least have that measure safe on its way to passage.

That reveals again the important leverage which the Congressional campaign has in shaping national legislation.

The same influences are at work in shaping the Congressional attitude—especially in the Senate—toward the agreements and treaties written in the Conference for the Limitation of Armaments. They were visibly manifest in the Newberry case. They control the situation that has arisen over railroad legislation.

It is difficult to measure the extent of the reaction of all of this on business. It certainly contributes to the uncertainty which is the bane of the commercial and industrial world. But it is the price we pay for the blessings of a representative government.

Ghosts.

Mill men today, in common with most other business men, are troubled by apparitions. Some of these spectres are very real, while others seem faint and dim as they pass down the vistas of memory or peep around the corners of its byways. But as the new year started on its march forward the everpresent dread of something abnormal, to which business men have become more or less accustomed during the last several months, seems to recede or diminish only to flash back temporarily as some ghost rattles its bones in the old familiar manner.

These intangible difficulties that seem to threaten the stability of business may assume one of a number of forms. The raw cotton situation may be difficult, buyers' ideas of goods prices may sag unexpectedly, mill costs may get out of line, the demand for finished product diminish, labor difficulties threaten, possible frozen credits seem to freeze harder instead of thawing as they rightfully should, the export trade situation may not work out as expected, anticipated tax reductions may not reach rosy political prognostications, Congress may play at politics instead of passing wise legislation or the laws it does make may not seem wise from a manufacturer's viewpoint. These are but a few of the thousand and one possibilities that may assail the mind of the executive during the coming months, particularly if jumpy nerves have magnified the mole hill of uncertainty into a mountain of doubt that casts a dense shadow over the whole business outlook.

But these wraiths of the commercial world almost always may be banished if the sunlight of conservative optimism is allowed to penetrate the hazy atmosphere of which their shapes are formed. The sunlight of optimism and the strong, clean breezes of individual effort will so modify and improve the visibility that even the tired and overtaxed nerves of the harried executives will recognize as a fog bank what at first glance seemed to be the dangerous funnel of an approaching tornado.

If cotton manufacturers will endeavor to whistle a merry little tune as they pass these intermittent graveyards of depression that will occasionally be found along the business highway of 1922, they will find that the awesome shapes they seem to see through the temporary gloom are largely figments of imagination, induced perhaps by the bulk of a harmless cow browsing by the roadside.

More Sob Stuff.

And now a staff writer in a commercial journal joins the propaganda club against the Dillingham immigration limitation act. He skirmishes around and finds two examples of people debarred by the law, selected out of several hundred thousand. While he makes these two cases seem deplorable, he admits that one of them was adequately cared for by the Secretary of Labor, leaving but one example for maudlin sentiment.

Why not be fair and admit that the act as written is fundamentally correct and absolutely necessary in order to protect our country from being overrun by the world's undesirables? It can be improved in detail and probably will be this year when a substitute is written into law by the present Congress. However, with the press of the country being flooded with propaganda literature by those interested in free and unlimited immigration, it behooves the editors of the business publications to see that any references made thereto indicate clearly that the act in itself is right and necessary; that any error pointed out is not intended to reflect on the Act but only on its methods of enforcement to the end that these may be improved.

Chairman Johnson of the House committee on immigration is giving a large part of his time to a study of these details in an effort to have a suitable act on the statute books by the time the Dillingham Act expires by limitation. That he has a difficult task ahead of him is conceded, as the coming election next November is already making itself felt in many quarters. Some Congressmen are already listening for whispers from back home and the anti-immigration-limitation crowd certainly can and will create a lot of buzzing.

Under these circumstances any aid or support that may be given to Chairman Johnson and his work will be adding a post to the solidarity of the nation and assisting to preserve for posterity something that still resembles the United States our forefathers founded and placed in our hands for temporary use and safekeeping. The business papers may assist in this work indirectly through their readers. Readers may aid directly by writing Chairman Johnson and expressing their approbation.

After citing legal decisions, the Department of Labor asserts that where a strike has failed and the employer refuses to recognize former employees, their places having been filled and normal production continuing, whatever rights of relationship the employees may have had at one time are extinguished.

Good Running Work and How to Secure It

BY GEORGE S. BROWN.

Production depends directly on how good or how bad the work is running in the mill. And the only kind of production that appeals to mill managers is big production. When the carding and spinning is humming along in fine shape and the help have time to clean and oil the machines properly the benefits secured add to the running conditions greatly. In a like manner when the work is running badly, the help are up to their eyes in work in merely trying to keep the ends up, having no time to clean or oil properly, and one evil leads to another till the plant is completely "busted."

The first requisite to good running work is suitable cotton. If a manager attempts to use cotton of a grade, staple or character unfitted to spin the yarns the mill is to make, he will never see good running work. If he has had the misfortune to have always been employed with a concern where such methods are prevalent then of course he doesn't know what good running work is, and will not in all probability keep everlastingly at it until he gets anything else. The purpose of this article is to help towards securing a better running mill, and hand in hand with this goes quality and quantity.

To begin with, the cotton buyer should know what kind of cotton he should purchase for his mill. If he doesn't know, then he shouldn't be on the job. Even in these enlightened times, it is surprising the number of cotton buyers who purchase cotton of a little shorter staple or inferior grade and apparently pat themeslves on their backs in thinking they can fool their carder and put the stuff through and nobody the wiser. A real carder is a hard man to fool. The buyer may be in a position to make the carder run whatever is given to him but the carder should not be held responsible for results when he has nothing to say as to the choice of raw material.

Even if the buyer did slip something over on the carder, he cannot fool his machinery. Every cent saved in buying unsuitable cotton is lost twice over long before the cotton reaches the woven fabric.

A buyer cannot mix 500 pounds of 1-inch cotton and 500 pounds of 1¼-inch cotton and get 1000 pounds of 1⅛-inch stock. Laugh! Yes, laugh! But this very identical thing is done every day and in mills where they should know better. The cotton buyer will take in two or three lots of cotton that are of inferior length of staple. Then he will purchase a lot of extra good stuff to "sweeten-up" things. And it certainly does the job.

Now and then a lot of low grade cotton is bought with the view of mixing it in "just a little bit at a time" and it is supposed "never to show up." This evil invariably leads to the same result. The dose is increased week by week and for a while it is a ripping success. Then comes a change and things are in a pretty mess. The spinner is down and out, and the weaver soon follows. We won't mention the carder for in the end he will have to assume the entire blame, for it is a safe bet that the cotton buyer won't.

One bale of extra cotton will cause enough cockled yarn to ruin many cuts of cloth because it gets scattered over a big area before it reaches the looms. Cockled filling gets in its bad effects by ruining the appearance of a fabric, while cockled warp gets in its deadly work by weakening the yarn as most of the cockles are pulled out at the spooler or warper and the strength of the yarn goes out with the cockle. Then the weaver has weak warps to handle.

It may appear all right to put in a bale of extremely dirty cotton (bought at bargain prices) now and then. It will mix up with the other cotton and never be noticed (?). Will it? It doesn't mix just that way. Instead of blending in nicely with the better cotton—it just "pickles" the whole mixing. That is what it does.

The way to buy cotton is to find out the cotton—staple and grade—that will be suitable for your work. Not too long nor too short. Not too high nor too low grade but just your average. Now, don't get anything better and don't get anything worse. Stick to that one type. Insist upon it. The most satisfactory way to do this is to pick out an actual bale of cotton for your type. Have this bale represent staple, grade and character. Buy every bale of your cotton equal to this type in all respects. Then when the cotton arrives, see that every single bale is up to type. Have your weigher take samples from every bale, two from each bale, one from each side and far enough in the bale to avoid surface dirt. Have each pair of samples numbered with the bale number where taken from and then turned over to your stapler, sampler or cleaner. Have each sample tested for staple, sand, dirt, leaf, color and working characteristics. Let your carder in on this if possible. He cannot know too much about the stock he will be compelled to run.

For this classing, a printed form made up something like sketch Fig. 1 and ruled for fifty bales will work out nicely. After a lot of cotton has been sampled and a record made then every bale that is short, too dirty, too leafy, off color, etc., should be rejected. In other words, if it is not fit to use—don't use it. Classing or sampling is of no earthly use if a mill fails to live up to it. Merely entering a bale as short and then later using it in the work because a slight rebate has been given in price isn't going to do the work any good. If a mill accepts a few bales in each lot that are not quite up to type, then its manager may prepare himself to get more and more such bales as the shipper will consider that he is satisfied and send such cotton in increasing quantities. Decide what is wanted and take nothing else.

Make up a sheet something like sketch Fig. 2. This will show all the lots of cotton on hand. I would suggest the use of four staples and four grades as follows:

Staple A Better than type.	Grade 1 Better than type.
Staple B Equal to type.	Grade 2 Equal to type.
Staple C Scant on type.	Grade 3 Slightly below type.
Staple D Shorter than type. Not fit to use.	Grade 4 Low grade. Not fit to use.

A mill manager shouldn't accept anything to enter under Staple D or Grade 4, but if compelled to, he knows

REPORT OF COTTON

Class B-1 SAMPLED Sept. 17, 1921

MARKS	Number	LENGTH OF STAPLE: 1 Inch	1 1-16 In	1⅛ Inch	1 3-16 In	1¼ Inch	1 5-16 In	1⅜ Inch	STRENGTH: Ordinary	Weak	Very w'k	LEAF: Ordinary	Consid'le	Very l'ly	SAND: Slight	Co nsid'e	Very	COLOR: Good	Off	Stained	WILL WORK: Good	Pair	Bad	REMARKS
CARY	1				X				X			X			X			X			X			
	2				X				X			X			X			X			X			
	3					X			X				X		X			X				X		
	4				X				X			X			X			X			X			
	5				X				X			X			X			X			X			
	6				X				X			X			X			X			X			
	7				X				X			X			X			X			X			
	8				X				X			X			X			X			X			
	9					X			X			X			X				X		X			
	10					X			X				X		X			X			X			
	11				X				X			X			X			X			X			
	12					X			X			X			X			X			X			
	13				X				X			X			X			X			X			
	14				X				X			X			X			X			X			
	15				X				X			X			X			X			X			
	16																							
	17																							
	18																							Good lot. Cotton
	19																							Wax tipped. Good
	20																							body. Even staple
	21																							

FIG. 1. A COTTON CLASSING RECORD.

from the sheet where it is and how much of the stuff he has.

When laying out the mixing for your mill use this sheet in the following manner: Choose six marks of cotton if possible. More if you can get them. We will say that you use 100 bales weekly. You study your cotton list and select six marks of different characteristics as follows:

16 Bales	"HAAX"	Staple A	Grade 2
16 Bales	"ANOL"	Staple B	Grade 2
17 Bales	"TONE"	Staple B	Grade 1
17 Bales	"ACCO"	Staple A	Grade 1

COTTON RECORD

	BALES		STAPLE				GRADE	
	REC'D	BAL ON HAND	A	B	C	D		
	100	84	HAAX				2	
	80	64		ANOL			2	
	115	115	JOSE				1	
	50	50	BOST				2	
	75	75	LONE				3	
	100	100		ARMI			2	
	75	58		TONE			1	
	110	93	ACCO				1	
	85	85		BABE			1	
	100	83		AATO			2	
	50	50		LXTI			2	
	50	33			BLNO		3	
	125	125	MOSR				2	
	15	15		CARY			1	

FIG. 2. A COTTON STOCK RECORD. MAKE ENTRIES IN THE SECOND COLUMN WITH A PENCIL. THEN CHANGE THE FIGURES AS BALES ARE USED.

17 Bales "AATO" Staple B Grade 2
17 Bales "BLNO" Staple C Grade 3

By selecting these marks you have secured a good average of all your cotton and you should keep this up throughout the year. If you used all the A-1 cotton first and then all of the A-2 and so on, then your work would ever be varying. Light and heavy, strong and weak, white and off color, clean and dirty. But by mixing as indicated you avoid all these troubles and worries. And any trouble or worry you can avoid, certainly do so, for there are plenty of others unavoidable. Also try and not have more than two new marks in any mixing. For instance, the next mixing should have at least four of the foregoing marks in it. This further guards against a big change in color, grade, etc.

Now make up a daily schedule: You have 100 bales. This gives you 20 bales each day for five days. We won't consider Saturday. Your schedule will be as follows:

Mark	Monday	Tuesday	Wednesday	Thursday	Friday
HAAX	3	3	3	3	4
ANOL	3	3	3	4	3
TONE	3	3	4	4	3
ACCO	3	4	4	3	3
AATO	4	4	3	3	3
BLNO	4	3	3	3	4
	20	20	20	20	20

For Monday's run, lay down the bales as follows: Open one bale HAAX, then beside it place one bale ANOL. Next one bale TONE, then one bale ACCO. Continue in this fashion until all twenty bales are opened and placed on the floor with passageways left so that any bale may be reached. Peel about a four-inch plate off the top of each bale and pile this up at one side. The outside of the bales often contains dirty or damaged fiber from weather exposure. If this top layer is fed into the breaker at once, you would stand a chance of putting a lot of your poorest cotton all in at one time.

Now start and feed a layer off of each bale, right straight along from bale No. 1 to bale No. 20. Then take a layer of the tops that you placed to one side and feed that. Continue the feeding, round and round until you have but a single layer from each bale left on the floor. This layer of bottoms is identical with the top layer you placed to one side. Place these to one side to be used in the next mixing. The next batch will supply you with twenty more tops at the start. Put these with the twenty bottoms and go ahead. Use your judgment in feeding these tops and bottoms so as to have them used up at the same time the balance of the twenty bales is cleaned up.

By following this system your mill is sure to benefit. No two bales of cotton are alike. Therefore the longer a bale is made to last in feeding, the greater area it is spread over in the stock in process, and the less any individual characteristic whether beneficial or injurious is felt. The first steps in processing the cotton are the most important ones in determining whether the work will run good or bad. Start it right and further efforts will tend to keep it right. Start it wrong and further efforts, no matter how painstaking and exhausting, will avail nothing. You have invited trouble and you will get it.

A rolling stone is seldom on the level.

Yarn Counts and Calculations.

"Yarn Counts and Calculations," a new book by Thomas Woodhouse which has just been published, is an interesting discussion of this important subject. It deals with the question of counts or numbers as applied to cotton, raw silk, spun silk, artificial silk, woolen, worsted, linen, hemp and jute yarns, and considers and explains twenty-two different systems of counting yarns as practiced in America, England and other countries, which, in the absence of a universal system of numbering or counting yarns, even of the same fiber, gives the reader an advantage by acquainting him with the large number of systems in use.

The author gives a definition of the different methods of numbering yarn as practiced in different branches of the industry and in different sections, as well as fundamental rules for this work, including convenient tables for use in each system of numbering and for each of the fibers treated. Also, he gives a system for converting counts from one system to another, and here also uses tables giving the "conversion ratio" that will give the value of any particular yarn in any other system in either the "fixed-weight" or the "fixed-length" group. In another chapter, there is an explanation of the manner of representing the count of multiple-ply yarns, and in another section the question of determining the cost of twisted yarns and mixtures is explained, while other chapters deal with the turns per inch or twist of yarn, explaining the relation between the counts of yarn and the twist per inch, and the angle of twist as applied to yarns.

The book is comprehensive, and covers its subject in a clear, concise manner, easily understandable, and, being the work of a man experienced in instruction work, should provide the student or beginner in any branch of the industry with essential information of value, as well as serving as a handy and convenient reference book on this subject for the practical spinner and manufacturer. It is one of the series of Oxford technical publications issued by Henry Frowde and Hodder & Stoughton, 1 & 2 Bedford St., London, W. C. 2, the price being six shillings net. COTTON's Book Department will be glad to handle orders for anyone interested.

A recent publication of the National Aniline & Chemical Company is entitled "Dyers' Formulas," and is prepared for use in connection with the 1922 spring season color card as recently issued by the Textile Color Card Association of the United States. In this book formulas are suggested for duplicating the shades shown in the color card, on cotton, wool and silk, and the recommendations given are the results of many experimental formulas on the different colors, and should be especially useful in the preparation of the shades in question. Copies of this booklet may be obtained by application to any of the branch offices or to the main office of the National Aniline & Chemical Co.

The Youngstown Sheet and Tube Company, Youngstown, Ohio, distributed an attractive calendar for 1922, showing on the different sheets some interesting views of various processes in their plants that are used in the refinement of iron into steel products.

How Air is Used in the Textile Industry

BY C. A. EDDY.

A recent number of a carefully read industrial paper takes to task the inconsistencies of the average executive. This executive, according to that paper, gloats over a 10 per cent improvement in labor he has been able to produce, while his machinery is wasting that 10 per cent of his labor, 20 per cent of his power, 30 per cent of his time and 40 per cent of his fuel. He worries over the loss of an order that would have amounted to a $2,000 profit, and imperiously waves away a dozen chances to save as much in the shop.

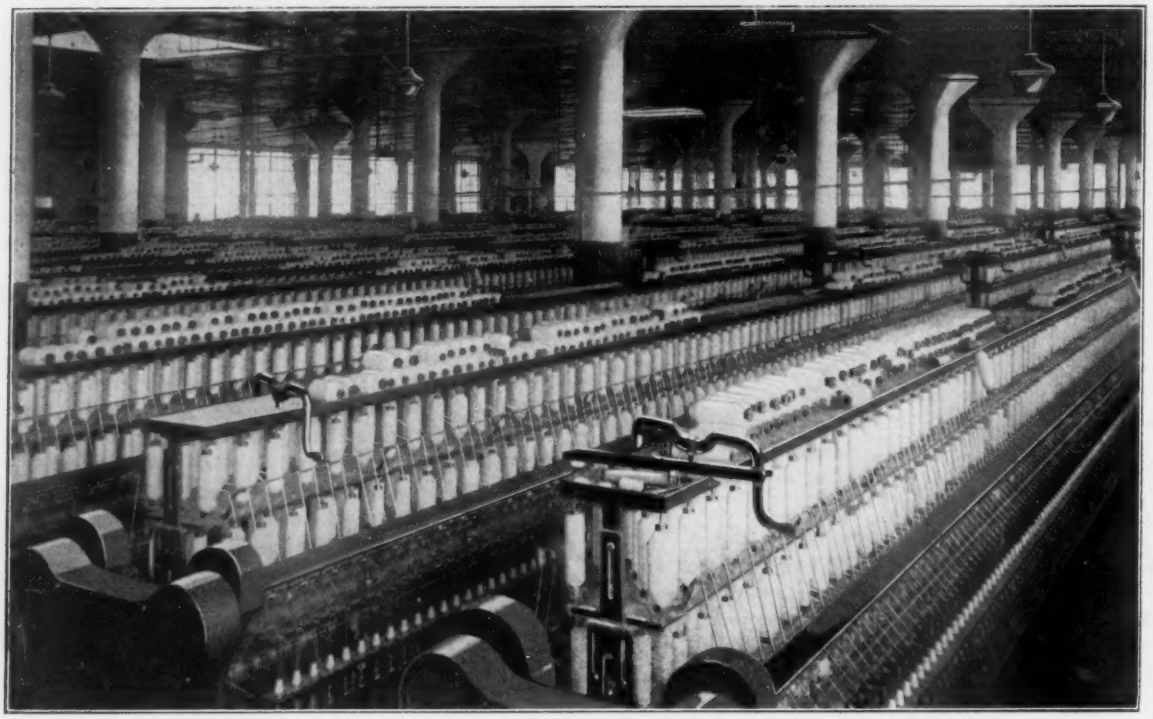
It is not the purpose of this article to go into details as to whether the average executive is consistent or inconsistent. Our experience has been that he is endeavoring to do his best many times under the most trying circumstances, and usually is searching about for plans and methods which will assist him in keeping his plant running on a profitable basis.

The textile plant has a great many things in common with other industries, but it is true that the handling of cotton, wool and products of that character cannot be accomplished in the same manner or by the same methods as would be used in a steel plant, foundry, etc. After all, however, both are dealing in the biggest thing of all —human nature. Both the textile plant and the steel mill, or the manufacturer of any kind of product, have to deal with the big problem—the man power in the plant, and after all that is the most important thing which determines whether the plant will run at a profit or a loss.

A great many factory officials are still working along the old time-worn lines. They cannot see the "hand writing on the wall," nor do they realize the many changes that are taking place in the industry and the big things that must be accomplished in their plants if they are going to keep up with the procession.

By this we mean that just because a factory was running on certain lines a few years ago, and that factory happened to make profits during certain years, does not necessarily mean that the same methods are going to be profitable today. In fact, it would be surprising if profits could be made when following the old lines, inasmuch as the past two or three years have seen such tremendous changes in all lines of business.

The whole situation today resolves itself into the question of how many employees and employers realize that factory conditions must be changed; that the methods of yesterday will not do today, and that in order to keep production up to normal successful methods must be adopted. The best part of it is that many of the successful methods which are helping manufacturers in other lines to show profits can be successfully adopted by the manager of the textile mill, and these changes need not necessitate a big outlay of money.

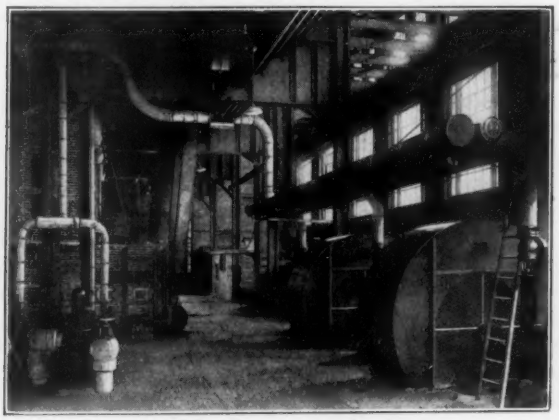


AIR CONDITIONING EQUIPMENT IN THE TEXTILE PLANT ELIMINATES MUCH OF THE LOSS DUE TO BREAKAGE OF "OOZY" YARN.

The question of right ventilation in the mill has been to a great extent solved by many who have given the time and thought necessary to this. When you stop to think about it, you will realize how important dependable ventilation is in the mill. It is not enough that the windows be occasionally opened to admit a small amount of fresh air, but provision must be made for a system of ventilation which will do a great many things, first of which will be

to supply fresh, clear air at all hours of the day to the workers.

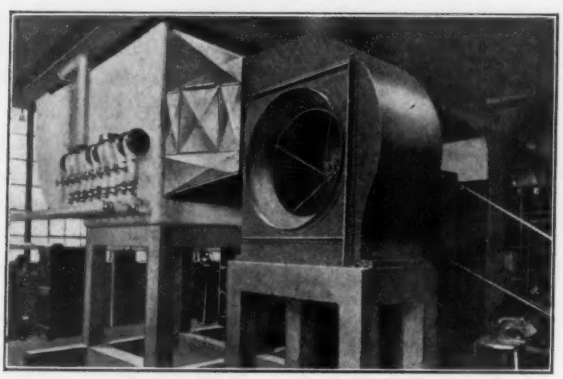
If you have checked up the working conditions in your plant you probably know that the hours during the late afternoon are the most unproductive of the entire day. There are several reasons for this, the most important of which is fatigue. If you will look at the matter a little further you will realize that one of the great causes of this fatigue is the fact that so many times great numbers of workers confined in one mill are not getting the amount of fresh air they need. The result is that during the



MECHANICAL DRAFT INSURES SUFFICIENT DRAFT TO KEEP THE BOILERS WORKING TO CAPACITY.

latter part of the day they begin to get drowsy, lose interest and are not as alert as was the case during the early morning hours.

If you want to prove this out, just wait until you have a particularly strenuous morning, and along in the afternoon you begin to feel tired out and incapable of doing much work. Leave your office, jump into your car and ride for twenty minutes or a half hour. Go where the air is clear and fresh, and then come back to the plant. You will see at once what we mean by the effect of poor ventila-



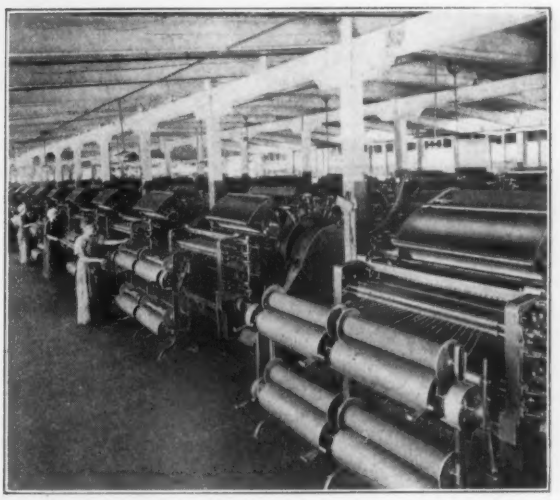
A VENTILATING FAN AND AIR WASHER INSURE PROPER ATMOSPHERIC CONDITIONS THROUGHOUT THE PLANT.

tion on workers when you realize after you come back from this ride how refreshed you are, and how much more alert.

It is just the same with the workers in the plant. While it is not possible for them to leave their work when they become mentally fatigued, you can make provisions for them getting the same kind of clear, fresh air without leaving the plant, and you can supply this so that they will breathe it at all hours of the day. That a good, dependable system of ventilation is worth far more than it ever begins to cost can be easily proven by getting in touch with a large number of far-seeing employers who have installed ventilating systems primarily for the benefit of the employees, but also with one eye on the production chart.

Aside from the health of the workers, there is another thing to consider, and that is the fact that clear, fresh air has a great deal to do with the mental attitude of the employee toward the employer. The man who works in pleasant surroundings and who feels good, will do his work well, be a much better producer and a more loyal employee than the man who is compelled to spend his time in an unhealthful atmosphere and uncomfortable surroundings. If a dependable system of ventilation in the mill did nothing more than this it would well be worth far more than it costs, but the large number of ways in which ventilation can be used to advantage in the factory and mill means that the question of ventilation for workers is only one point which should be considered.

The next point to consider is the improvement of conditions through which raw material is handled and the im-



FRESH AIR FOR WORKERS IN THE MILL IS VITALLY NECESSARY IF THEY ARE TO REMAIN SATISFIED AND KEEP PRODUCTION UP TO NORMAL.

provement of the quality of the products. In those departments of the textile plant where the "fly" or fine, impalpable dust rises from the handling of material, exhaust fans will draw off the air containing these small particles and supply fresh, invigorating, healthful air in its place. In those departments where fumes poison the air, exhaust fans also perform a similar valuable service.

On the air conditioning side, advantage may be observed more closely in textile mills than most other plants. The right kind of air conditioning equipment enables the manufacturer, first, to maintain in all seasons, in all parts of the mill, the exact degree of humidity best adapted to the fabrication, or to vary this humidity whenever it is desirable. Second, it enables him to renew the air in any department in such a manner as to conform to the hygienic requirements or to the particular character of work being performed. Third, to maintain the temperature within

certain limits the year round, week after week, and day after day, economically.

A multitude of production troubles in textile work are eliminated by this commendable temperature and relative humidity in the atmosphere in which materials are being worked, as fabrics are of a hygroscopic nature and highly sensitive to heat and moisture. For instance, in the manufacture of yarn, static electricity affects the fibers, if the air is too dry, causing them to repel each other and fly apart, producing what is known as "oozy" yarn. This results in innumerable breakages, ends and wastage, fly, loss of time, and inferior strength and quality of the manufactured product.

In the handling of all cotton fibers the effects of the control of the atmospheric condition in which the materials are being worked are particularly important. A certain heat is necessary to spin cotton properly, to soften the fiber sufficiently to enable it to slide easily one over the other in the processes of drawing and spinning. When under hot or dry conditions the fibers are very susceptible to the influence of static electricity, thus the importance of being able to control both the temperature and humidity of the air to kill this electricity and to sufficiently melt the fibrous fabric so that moisture in the air can permeate, under osmotic action, in the inner cell until it finally reaches the inner tube containing true cotton.

An equally important effect of the control of the atmospheric conditions is seen in the setting of the yarn. Relatively high temperature in spinning is due to the presence of wax or cotton seed oil in the fibrous envelope. The setting of the cotton is dependent upon the presence of this oil. If yarn is spun in dry or hot conditions, strength is affected and a curl produced by twist, difficult to overcome. The setting of the yarn is also to some extent governed by the static electricity to which it is subjected during manipulation.

Proper humidity in the air diminishes in a large measure the presence of flying dust, purifying the air of fumes to such an extent that if combined with an efficient method of ventilation it will reduce the carbon dioxide, and other gaseous impurities, to a minimum. Regulation of the amount of air induced into a room, as well as its temperature, the humidity, and of its distribution, are of course essential elements to obtaining the most desirable and satisfactory results.

Air always contains a certain proportion of water vapor, but in extremely variable proportions. The absorption capacity of air for water varies with the temperature, thus these two factors—temperature and humidity—are directly interdependent, hence the importance of the control of both of these factors as provided through an efficient humidifying system.

Aside from the control of air in the mill and plant, there is another place where ventilation equipment, such as fans and blowers, is used to advantage. This is in connection with the operation of the boilers where forced or induced draft is necessary. A great number of engineers have found that even with a poor grade of coal they can with mechanical draft make this coal serve the purpose, because no matter what the atmospheric conditions are outside, or whether they have a large or small stack, they will always have a sufficient draft to keep the boilers working to capacity.

The production chart goes up or down, dependent entirely upon the manufacturing methods used in the plant. If some of these points are followed, which we have outlined, and investigation made of just what efficient ventilation is doing in the plant, it will prove an "eye opener" to a great many. A system of dependable, day in and day out ventilation can only be secured by means of the right type of fans, blowers, air washers, etc. We cannot possibly begin to get the necessary results, nor secure the satisfaction which is necessary, through depending upon open window ventilation.

It is no more possible to run a plant along the right lines by depending upon "hit and miss" methods of ventilation than it is to properly operate a theatre, school or any public building where ventilation is of such great importance. As we said at the beginning, the most important thing of the whole business is the question of man power, and ventilation is after all one of the biggest things which you could furnish your employees if you are going to keep them satisfied.

The man who is on the job day after day, who does his work in the way it should be done, should not be handicapped by being compelled to breathe stale air during the major part of the day. Furthermore, if this handicap is placed upon such a man, it is not very long before he will be found to be an "in and out" man—here today and off tomorrow. It will not be his fault, because the lack of dependable ventilation is a tremendous handicap to any mill or textile plant, factory worker or executive.

Cotton Facts.

The 1921 edition of "Cotton Facts," the well known statistical reference book of the cotton trade, is now ready for distribution, with the regular tables and figures that have been features of previous editions brought up-to-date, and including a number of new and additional sections which enhance its value to anyone interested in market statistics.

This edition contains, among other features, comparative statistics on killing frosts, seasons 1919-20 with 1920-1921, extended statistics on ginning to specified dates to cover a period of ten years; exports from Egypt; world's invisible supply, carry-over, and supply at the end of season; Japanese consumption; exports of cloths and yarns from the United States, consumption of spindles of the world; extended tables on sales of print cloths, trade in foreign countries, cottonseed exports; information on cottonseed-oil, meal, etc.

Another new feature of this edition is that the entire book has been re-arranged so as to be more convenient for reference and consultation, tables bearing on the same subject having been collated so as to bring all statistics on any certain subject contiguous to one another. The whole book is arranged in orderly sequence, following the staple from its first analysis to final distribution, and taking up in proper order its planting, cultivating, harvesting, ginning, marketing, manufacture and distribution.

"Cotton Facts" is published by the Shepperson Publishing Company, Cotton Exchange Building, New York City.

Popular Textile Chemistry

BY JAMES A. BRANEGAN,

PRESIDENT, KALI MANUFACTURING CO., PHILADELPHIA.

Ammonia (NH_3) and Its Salts.

Practically all the ammonia used today is produced in the manufacture of coke and gas. The large blast furnaces and steel mills need both coke and gas and these are produced by subjecting coal to a process known as "destructive distillation." By this process the coal is placed in a retort or oven and heated from below. No air is admitted to the retort and the result is that when heated to a high point the volatile substances pass off leaving coke, which is mostly carbon, behind in the retort. The volatile matter consists of coal tar and gas. The coal tar is condensed, and the gas liquor containing the ammonia is treated with boiling lime water which liberates the ammonia. The free ammonia is passed through an absorbing tower containing sulphuric acid, with which it combines to form Ammonium Sulphate (Sulphate of Ammonia). This ammonium sulphate is crystallized and separated from the liquor in which it formed and which is mostly water. It is then redissolved in water and recrystallized to purify it. Part of this ammonium sulphate is sold to fertilizer manufacturers who mix it directly with other materials to make up artificial fertilizers. Another portion of the ammonium sulphate is treated with lime water and boiled. This treatment drives off the NH_3 or anhydrous (without water) ammonium gas. One portion of the NH_3 (one part nitrogen and three parts hydrogen) is compressed into cylinders and sold to manufacturers of artificial ice. The greater portion, however, of this NH_3 is run into water where it combines to form Aqua Ammonia (NH_4OH) or Ammonium Hydroxide as it is technically known. The reaction between the ammonia gas and water is expressed as follows, the formula for water being H_2O meaning two atoms of hydrogen and one atom of oxygen.

Ammonia Gas		Water		Ammonium Hydroxide or Aqua Ammonia
NH_3	+	HOH	=	NH_4OH

Cold water will absorb the NH_3 until the solution contains 29 per cent of the gas, and this is the aqua ammonia 26° Baume konwn to commerce. Other strengths such as 20°Baume which is used by dyers and 16° Baume which is used for household purposes is made by simply diluting the 26° Baume with distilled water.

The Baume test on ammonia is misleading as most people believe ammonia 26° Baume test means 26 per cent while it actually contains 29 per cent of NH_3. The inventor of the Baume hydrometer certainly tried his best to mix things up. There are two Baume hydrometers, both based on the specific gravity of liquids. One hydrometer is for liquids heavier than water while the other is for liquids lighter than water. On the heavy hydrometer water = 0° or zero and the figures run up as the gravity increases so that oil of vitriol which contains 93 per cent of sulphuric acid tests 66° Baume. But on the hydrometer for light liquids (ammonia, etc.) water tests 10° Baume, so that aqua ammonia has a range of only 16° on this instrument instead of 26° as most people believe. The heavy Baume scale was designed by dissolving a portion of salt in water and calling it 1°, adding a new mark after each addition. The light liquid or ammonia hydrometer was made up by adding alcohol or other light liquid to water and marking the scale as the mixture became lighter in weight causing the hydrometer to sink lower, which naturally happened after each addition. Why the inventor called water 10° on the light liquid hydrometer and 0° on the heavy instrument is hard to comprehend. Much better testers are the specific gravity (generally written S. G.) hydrometers the figures of which indicate the specific gravity of a liquid as compared with water the unit. For instance, on the S. G. hydrometer sulphuric acid (oil of vitriol) tests 1.84, meaning it is 84 per cent heavier than water; in other words, a vessel holding 100 pounds of water when filled would hold 184 pounds of oil of vitriol. On the S. G. hydrometer ammonia full strength tests .90, meaning 10 per cent lighter than water, and a vessel holding 100 pounds of water when filled would hold only 90 pounds of ammonia, full strength. Compare this intelligent method with the Baume scale which conveys no comparison to the mind. All chemical laboratories and technical men have now adopted the S. G. hydrometer and it is to be hoped that the dyer will likewise adopt this instrument.

There is another tester called the "Twaddle Hydrometer," which, like the Baume hydrometer, has an optional scale and gives the readers no definite idea of the weight of liquid as compared with water. For all purposes where tests of this character are desired, the "Specific Gravity" hydrometer should be used. It should, however, always be remembered that the hydrometer test does *not* indicate what the solution contains. Anything that dissolves in water makes the hydrometer go up or down, so that the operator should always know beforehand exactly what is in the solution.

The formula for ammonia already given, namely, NH_3, means 1 atom of nitrogen (symbol N) and 3 atoms of hydrogen (symbol H). It will be noted there is no figure after the N, and the absence of this figure signifies one atom or part, as in chemistry we usually omit the unit. The expression NH_3, however, does not indicate the form in which ammonia is used in the dyehouse, as this form of ammonia (NH_3) is the gas dissolved in water to form ammonium hydroxide, as mentioned, and commercially called aqua ammonia.

Aqua ammonia is sold in tank cars, drums, carboys and bottles. It should not touch brass or copper as it quickly corrodes these metals, and the ammonia itself will turn blue and contain copper salts. Dyers who buy ammonia in drums should remember this and use an *iron spigot* to draw off the ammonia.

Besides the liquid form, the ammonia gas (NH_3) is compressed until it liquifies, and shipped in iron cylinders which hold 25 to 100 pounds of the gas. When this NH_3 (ammonia gas) is liquefied the pressure is very great, and the latent heat of the gas, when compressed in a small space, causes the compressors to become hot. This heat is removed by running water on the pipes. In making artificial ice the process is simply reversed. The liquefied

gas in the cylinders is released and, becoming gaseous again, it occupies considerable space and draws heat from its surroundings until it recovers the latent heat it lost. Everything within the sphere of this action becomes intensely cold. After the freezing is complete the gas is again compressed and again robbed of the heat it took from the other substances. This is easy to understand when we realize there is *no such thing* as cold. A cold condition is simply the absence of heat.

Acetate of Ammonia—$NH_4C_2H_3O_2$.

In wool dyeing with acid colors, it is found that certain dyes go on the yarn or goods too quickly, even with the most inactive of acid mordants, such as formic acid, with the result the material is unevenly dyed. In such cases the slowest possible mordant is required and for this purpose acetate of ammonia is frequently used, and with good results. In the dyeing process, the acetate of ammonia is alkaline at first, but as the bath warms up it loses its ammonia and slowly turns acid. This gives the goods a chance to become evenly impregnated with the dye before the acetic acid, as a mordant, starts to work. Acetate of ammonia is made by combining aqua ammonia and acetic acid. All the symbols in this reaction are explained in the foregoing paragraph, with the exception of "C" in acetic, which is the symbol for carbon. The following shows the reaction in making acetate of ammonia:

AQUA AMMONIA ACETIC ACID ACETATE OF AMMONIA WATER

$$NH_4\boxed{OH + H}C_2H_3O_2 = NH_4C_2H_3O_2 + H_2O$$

Note how the hydroxyl group (OH) in the ammonia combines with the hydrogen (H) in the acetic acid to form water (H_2O). In combining these two chemicals, great care must be taken to keep them from getting hot. This is a difficult proposition as much heat is generated by the reaction itself and heat means a loss of ammonia. The usual practice is to mix at a low temperature, this temperature being sustained by either brine coils or an external ice pack.

Ammonia Chloride—NH_4Cl (Sal Ammoniac).

Although this salt is usually associated with wet batteries such as are used on door bells and other intermittent work, it is used to some extent in the dyehouse. Some dyers of oxidized black add it to the aniline salt mixture to "carry moisture" and thereby prevent the goods from burning, and in sizing it is added so that the goods will retain moisture and have a little more weight.

When aqua ammonia and hydrochloric acid (muriatic acid) are brought together they immediately combine to form ammonium chloride. Even the very dilute fumes from these two chemicals can be seen to combine in a white vapor. Place a bottle of ammonia water alongside of a bottle of muriatic acid and remove the corks and watch the white "smoke" curl from both. This is Ammonia Chloride, and if made in volume the smoke will settle down as a white powder or crystallize out if made in solution. Chemically, the reaction is similar to that of acetate of ammonia—"Cl" in this reaction stands for chlorine.

AQUA AMMONIA (HYDROCHLORIC ACID MURIATIC ACID) AMMONIUM CHLORIDE WATER

$$NH_4\boxed{OH + H}Cl = NH_4Cl + H_2O$$

Here, again, the hydroxyl group (OH) in ammonia combines with the hydrogen (H) of the acid to form a salt and water. These reactions between bases (alkalis) and acids are characteristic in the formation of most salts, and the reason the reaction does take place is due to affinity. In the case of acetate of ammonia the acetic acid radical has a greater affinity for the ammonia radical than it has for the hydrogen radical, therefore, they exchange places. The same reaction occurs when the ammonia and muriatic acid are brought together, in fact, ammonia combines with mostly all the acids to form salts of these same acids.

Sulphate of Ammonia.

This salt is occasionally used as a mordant and is manufactured in the same manner as the acetate and chloride, except that sulphuric acid (H_2SO_4) is used instead of acetic or hydrochloric. The "S" in H_2SO_4 is the symbol for sulphur.

Sulphuric acid differs from the acids already mentioned in that it is disbasic, in other words, it has twice the combining power of hydrochloric and acetic, and has two atoms of hydrogen in its molecule which must be replaced by ammonia to exactly neutralize the sulphuric acid and form the normal sulphate of ammonia. Therefore, it requires two complete molecules of ammonia to express the reaction.

AQUA AMMONIA (2 MOLECULES) SULPHURIC ACID (1 MOLECULE) SULPHATE OF AMMONIA (1 MOLECULE) WATER (2 MOLECULES)

$$2NH_4\boxed{OH + H_2}SO_4 = (NH_4)_2SO_4 + 2H_2O$$

The large figure "2" before the ammonia and the water means two complete molecules. Note how the equation balances. This reaction could be more graphically written as follows:

$$\begin{matrix} NH_4 \\ NH_4 \end{matrix}\boxed{\begin{matrix} OH & H \\ OH & H \end{matrix}}SO_4 = \begin{matrix} NH_4 \\ NH_4 \end{matrix}\!\!>\!SO_4 + \begin{matrix} H_2O \\ H_2O \end{matrix}$$

The first method of expression, however, is the correct one, and after glancing at the second, is easily understood.

All the elements of which ammonia is composed are found in air and water, and several processes have been patented to produce ammonia from air. In Europe, this method has been developed to a great extent, but in this country the amount of ammonia produced from air nitrogen is very limited. Chemists, however, look on this as the method of the future, particularly in view of the fact that the same process produces nitric acid, a chemical much in demand for military powders and explosives. During the war Germany could not get nitrate of soda from Chile and had it not been for her air reduction plants the war would have been of short duration.

The next article will be on metallic salts used in the dyehouse.

Lowinson's Comparative Cotton Goods Chart for the year 1921 is now ready for ditsribution. This chart contains, as usual, the principal staple grey cotton goods constructions, as well as spot cotton, showing their rise and fall in price throughout the year. Any readers associated with the grey goods industry and who are interested in this chart, may receive copies gratis by addressing Louis Lowinson & Co., 66-72 Leonard St., New York City.

If what you did yesterday still looks big to you, surely you haven't done much today.

Six Definite Things That Workers Want

4. A Chance to Learn

BY JAMES H. COLLINS.

Up in the Canadian woods they were getting ready to take out a big "spar tree." There was a college man in camp. He thought he knew how to use an ax—had often cut down small trees back home. He asked the foreman if he might cut this giant fir. The foreman's refusal was kindly:

"There is only one layout for that tree," he said. "She must go between that hemlock and the tall spruce. If it falls anywhere else, our work will be balled up—you might even lock it onto another tree. It takes three years to make a good 'faller.' The head 'faller' and I must cut this one."

The college man was humiliated, but got some idea of the technicalities in work like logging, popularly supposed to be "unskilled."

The next day was Sunday. He and the foreman had a talk. The latter said he envied the college man's knowledge of geometry, algebra, and even physics, for he felt that with a background of science and his practical experience, he could learn lots more about logging. A little science would enable him to handle forest giants much more skilfully, quickly, and with less drudgery, and save hundreds of men from being killed and hurt every year in the woods for lack of theoretical knowledge. Canada is now studying ways to give such men the theoretical training needed in their every-day work through the "university in overalls."

It used to take nine tailors to make a man, and at least three tailors to make a suit of clothes. Today, it takes several dozen workers to make a coat. Formerly, the cobbler made a pair of shoes, but now shoe-making is cut up into a regular jig-saw puzzle of little tasks.

"Where can we get all-around men who know how to tackle a machine-shop job—maintain a railroad track-repair a watch?" executives are asking—everywhere the same complaint. After cutting work up into specialties, and the specialties into bits that can quickly be taught a greenhorn, industry now finds that it has eliminated the all-around worker who knew the whole trade, and could be counted upon for supervision and improvement. Moreover, it needs all-around men of kinds not developed by old-fashioned apprenticeship—men who understand designing, selling, accounting, management and the like, from the theoretical as well as the practical side.

Things have gone so far that industry is threatened, and the worker is threatened even more. It is often said that the present-day industrial worker is a machine, but the blunt truth is that he is less, for his task is often so simple and impersonal that he can be more easily dispensed with than the machine he operates.

When the teacher sent little Jakie Cohen home with a note asking that his neck be washed, his mother wrote back: "Don't wash Jakie—learn him!" And that is the answer to the executive's question: "Don't complain about workers' knowledge and ability—teach them."

(Copyright, 1922, by J. H. Novins.)

The employee may be more far-sighted in this matter than the boss. One of the correspondence schools that specializes in technical training has lately begun publishing a monthly journal called "Trained Men," entirely devoted to this subject of employee education, emphasizing its advantages to the executive more than those for the employee—largely because the latter has already been "sold" on industrial education. That employees are very often making their own efforts to acquire the theory behind their jobs is shown by the number of students in nearly nine hundred manufacturing, commercial, transportation and mining corporations. More than three hundred railroad companies have employees who are studying correspondence courses, $80,000 worth of such courses having been sold to employees of a single railroad in less than five days. Very often, an educational movement of this sort will get under way among employees almost unknown by employers. Real desire to learn furnishes part of the impetus, and systematic sales work and study supervision by the correspondence school the rest. Employers become interested when the correspondence schools report to them the progress of individual employees, and when promotion demonstrates that such training is sound, employers frequently offer to pay part or all of the tuition fees for employees who will study courses within their abilities.

There are several distinct kinds of education needed in nearly every business.

The commonest is simple task teaching, which may comprise anything from showing Johnny, the new office boy, how to wield a broom, up to the multiplication of riveters in a shipyard by separating the work into its basic parts, and showing an expert riveter how to teach it to the novices—something that was done most successfully during the war. Task teaching quickly gives the worker earning power, and the employer production. There it is apt to stop for both of them, however, unless linked to the tasks that go before and come after, and the theory behind all of them. Probably not one worker in ten is interested beyond his task. But the tenth fellow, who is, can be developed. Wider knowledge will fit him for supervision, inspection or transfer from the department as the need arises. If the employer neglects his training, he will train himself and market his increased ability in some other plant.

Task teaching is pretty much a plant activity, because tasks differ in each plant.

Theory teaching is seldom successful as an exclusive plant proposition, say educational experts. Only the largest corporations can afford to maintain private schools for teaching subjects like engineering, mechanics, administration, metallurgy and the like. Good teachers are scarce and costly. Good text-books written from the slant of a given business are even more expensive. Employees who might benefit by the school are often widely scattered. The breadth of such studies peculiarly adapts them to the

text-books, teachers, and systematic encouragement of the correspondence schools.

How a thing is taught makes more difference in results than is expected by the "practical" man who criticizes teachers for "too much theory." As an example of good teaching, take a subject which many workers are anxious to study—the English language, which is needed by the foreign-born, as well as common school studies by workers born in this country, but enjoying little schooling. Given ordinary text-books, the Italian or Slav would find himself hopelessly entangled in grammar. Using the lessons prepared by Dr. Peter Roberts, a real teacher, Giovanni or Jan find themselves learning words that they can use every day in finding a job, buying clothes or taking a railroad journey.

Still another important field of teaching is that which imparts the things that lie beyond even the technical theory of a business concern or an industry—its policies, spirit, broad tendencies, and the general direction of its invention and progress. These are not taught in classes, but are spread through the encouragement of reading technical and scientific journals and books. Some business concerns subscribe to enough copies of important periodicals to maintain a circulating service of marked copies, each article automatically coming to every person in the organization who ought to read it. Other concerns, finding many books purchased by the management are scattered through different departments, have brought them together in a special library, to which every interested employee has access. Yet again, each broad subject pertaining to products, processes, research, management and the like, is systematically covered by clippings and filing important articles as they appear, with a portfolio devoted to each subject.

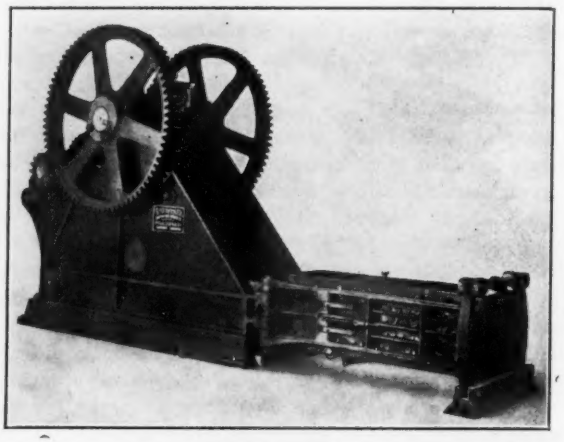
It is now widely admitted by employers that the all-around quality in workers must be restored by teaching.

It is not so widely realized, however, that workers want to be taught—that they see in study their chief opportunity for advancement, and are willing to make real sacrifices to acquire knowledge. Not all workers appreciate chances to learn—perhaps not one in ten, or even one in twenty. But those who do, the intelligent, ambitious, healthy-minded men and women, are enough to leaven the mass and furnish the initiative and leadership that has lately been disappearing from American industry.

A New Power Baler.

The Southwark baler was designed to fill the requirefor a machine that will press bulky material such as cotton linters, rags, paper and various materials into a compact bale, whereby the usual tare charges on freight shipments can be avoided. When working at full capacity it consumes about 30 hp. It can be operated by two men. When the machine works on paper mill cotton stock it requires three men, because this stock is invariably covered with a paper wrapper. The press operates continuously. The material is fed into the baling box through a chute and the plunger of the machine pushes the material into the tapered baling chamber as fast as it is fed into the box. The compressed material comes out at the other end of the machine in a continuous bale, which can be broken off at any point required to make up the required weight that the bales are to carry. The bale after being broken off requires one wire tie only. This is put on the bale after it is out of the baling box, where it is very easily handled.

Any density required between 15 and 55 pounds per cubic foot is obtained by simply adjusting the taper of the baling box. This is accomplished by turning a screw having a right and left hand thread. The standard machine is designed for giving a pressure of 100 tons on the bale.



THE SOUTHWARK BALER.

This pressure is exerted through a system of toggles, the motion being received from a crank shaft which carries the steel gear with cut teeth on each end of the shaft. There are two reductions of gearing between the crank shaft and the flywheel shaft. The flywheel is of sufficient size to maintain a constant speed of the crank shaft at continuously full capacity,—16 strokes of the plunger per minute.

All castings entering into the construction of this machine with the exception of the bed plate, are open hearth steel castings and all shafts are hammered steel forgings; all gears are of coarse pitch with cut teeth. The construction throughout is such as to eliminate any possibility of break downs in service.

This new baler is built by The Southwark Foundry & Machine Co., Philadelphia, Pa.

"The Trackless Train" is the title of a new folder being distributed by the Mercury Manufacturing Company, Chicago, Illinois, which describes the new Mercury Type K tractor. It is stated that this model is the smallest industrial tractor made, being 6 inches narrower and 10 shorter than other types. It is declared to be particularly adaptable for use in textile plants, and its use in this connection is well illustrated by photographs of these tractors together with their "trackless trains" of trailers in use in various phases of textile mill work. It is designed to be especially suitable for interdepartmental transportation in textile mills, as its compactness allows of easy operation in narrow aisles, around sharp turns, etc. Trailers especially designed for particular kinds of material, such as bobbins, slasher beams, etc., can be supplied for use with these tractors.

"You cannot make others feel unless you yourself feel;
You cannot make others see unless you yourself see."
—Elbert Hubbard.

The Design and Manufacture of Fustians

BY T. WOODHOUSE AND A. BRAND.

Corduroys.

Corduroys are constructed on principles which are almost identical with those described and illustrated in connection with velveteens. The chief difference between the two types is that whereas in velveteen weaves all the floats of filling for the pile are of the same length, those for corduroys are arranged in various lengths. Hence, when the fustian cutting knife severs the floats, the surface of the fabric becomes undulatory, or of a ribbed character, similar to, but more pronounced than that shown in Fig. 15 in connection with corded velveteens. The effect, indeed, is more or less like a series of cords lying on the surface of a comparatively simple fabric; the cords lie parallel to each other and to the warp.

As in the case of velveteen weaving, the corduroy fabric in the loom presents no unusual feature, and is, in this state, a simple weft-faced fabric with a tendency to exhibit furrows and ribs. The characteristic ribbed pile surface is obtained, as in velveteens, by a process of cutting subsequent to the weaving operation, and prior to the finishing process, although, indeed, the operation of cutting in itself may be correctly regarded as the chief part of the finishing process.

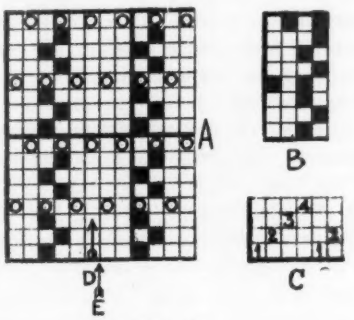


FIG. 26.

As a rule, corduroy fabrics are heavier and of more durable construction than velveteens simply because of the insistent demand for greater wearing qualities. In addition, the weaves have naturally to be specially arranged so that the above-mentioned furrows and ribs will be more or less pronounced, and so that the characteristic half-round rib appearance or corded effect may be obtained. These ribs or half-round effects are, in general, of the same width and height in any particular fabric, but the widths and heights of the cords or ribs may be varied according to requirements.

Occasionally, an elementary degree of ornamentation is obtained in corduroy fabrics by producing two or more different widths of rib or cord in the same cloth; and, when this is the case, there are, of course, various heights of the half-round effects corresponding to the different widths, and to the lengths of floats from which the pile tufts are obtained by central cuting.

Most of the weaves usually employed in the production of corduroys have the pile and ground filling in the proportion of 2 of pile to 1 of ground, while some simple 3- or 4-harness twill is used for the foundation texture. But there are many varieties, in consequence of which it is impossible to lay down hard and fast distinctions. Particularly is this the case with the so-called velvet cords, which are mainly used in the production of garments for ladies and boys, and which bear a strong superficial resemblance to the hollow-cut velveteens previously described. These velvet cords are light textures compared with

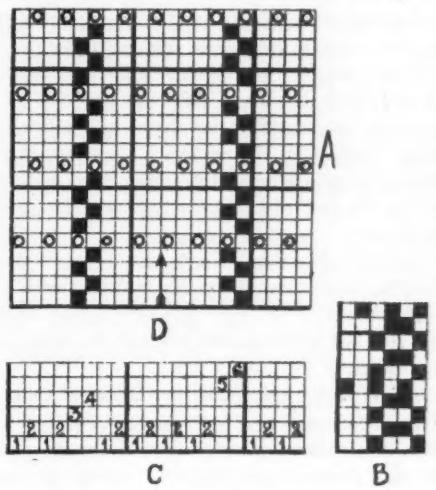


FIG. 27.

corduroys proper; they have a plain weave foundation fabric, and are variously made with 3, 4 or even 5 pile picks to 1 ground pick, in order to obtain a dense pile and a distinct rib.

Typical examples of the above weaves are given in Figs. 26, 27 and 28, all of which have a basic texture of plain weave, and all of which are mainly suited to the production of velvet cords. In Fig. 26, A shows four repeats of the point-paper design, two in the way of the warp,

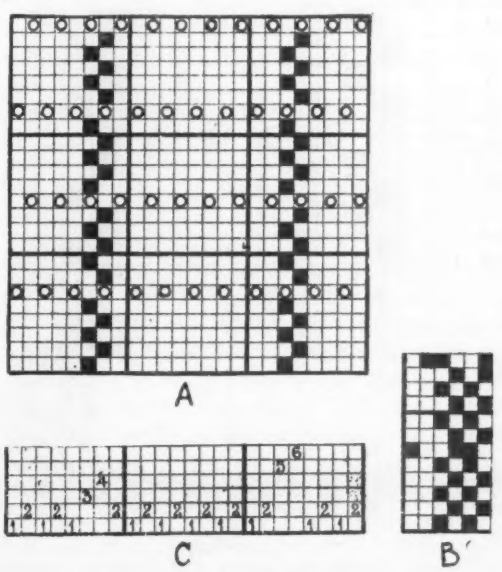


FIG. 28.

and two in the way of the filling. The unit weave is therefore complete on 6 threads and 8 picks, while the filling is inserted in the following order: 3 picks of pile, indicated by solid squares; 1 pick of ground, indicated by circles. The ground weave is plain, tabby or calico; the pile picks are stitched into this plain back on every sixth thread, thus forming floats of 5. In order to form the pile tufts, the fustian knife is passed up the races formed by these floats, at or near the center.

If the knife is passed into the race in such a position that the floats in the first pile pick are severed exactly in the center as exemplified by the arrow D, it will be evident that the corresponding floats on the second pick will be cut into two unequal portions, one corresponding to a float of 1½ threads, and the other to a float of 3½ threads. There would thus be three different lengths of tufts, whereas, if the cutting knife be passed under the floats at the position marked by the arrow E, there would be only two different lengths formed from each float, a 3-float and a 2-float on the first pick, and a 2-float and a 3-float on the second pick.

This brief explanation is sufficient to show that different lengths of pile are obtainable by using such a weave as that illustrated at A, Fig. 26. The exact manner in which the rounded effect is obtained will be more fully explained presently.

Illustration B, Fig. 26, shows one weaving plan suitable for the production of weave A in the same figure, while C is the corresponding draft. It will be seen from the plan B, that weave A is capable of being produced by 4 harnesses with 8 picks for each revolution of the tappet. The draft shown has the advantage of placing the most crowded harnesses at the front, nearest to the weaver. It is possible, of course, that under certain circumstances, 6 harnesses with a straight draft would be employed.

Figure 27 illustrates another typical example of this kind of weave, but arranged to give a longer float than that shown in Fig. 26. Two repeats of the weave in the way of the filling are shown. There are 10 picks to the round, inserted in the following order: 4 picks of pile filling, and 1 pick of ground filling, while there are 20 warp threads in each repeat of the weave. This comparatively large number of threads in the unit weave is necessitated by the change in the order of the stitching points of the pile picks.

Reverting to Fig. 26, it will be seen that the stitching points occur in exactly the same order for every cord or rib, and all the floats of the filling are exactly the same length, viz., over 5 threads. One complete cord thus constitutes one repeat of the design. A further reference to Fig. 27 will show that one set of stitching points of the pile picks is the exact reverse of the other, and that two lengths of floats are produced, viz., one over 10 threads, and the other over 8 threads. One repeat of the design thus contains two complete cords or ribs. In either case, however, the process of cutting would produce unequal lengths, that is J- and reverse J-shaped tufts.

In Fig. 26, the knife would probably be passed up the race at or about the point indicated by the arrow E; the float of five would thus be divided in the proportion of 2 to 3. Again, in Fig. 27, the knife would be passed up the exact center of the weave, as shown by the arrow D; nevertheless unequal lengths in the tufts would be produced, because the different method of stitching results in alternate floats of 10 and 8 in each pick right across the fabric. The comparative lengths of the tufts obtained from two successive picks would thus be 5 and 4.

The design shown at A, Fig. 27, is thus complete on 20 threads and 10 picks, and is capable of being drafted on 6 harnesses, using the weaving plan shown at B, and the corresponding draft C.

Figure 28 shows the design, draft and weaving plan of a third example. The design at A shows two repeats in the way of the filling, and one in the way of the warp. The unit weave is therefore complete on 24 threads and 12 picks, and the latter are inserted in the following order: 5 picks of filling for pile; 1 pick for filling for

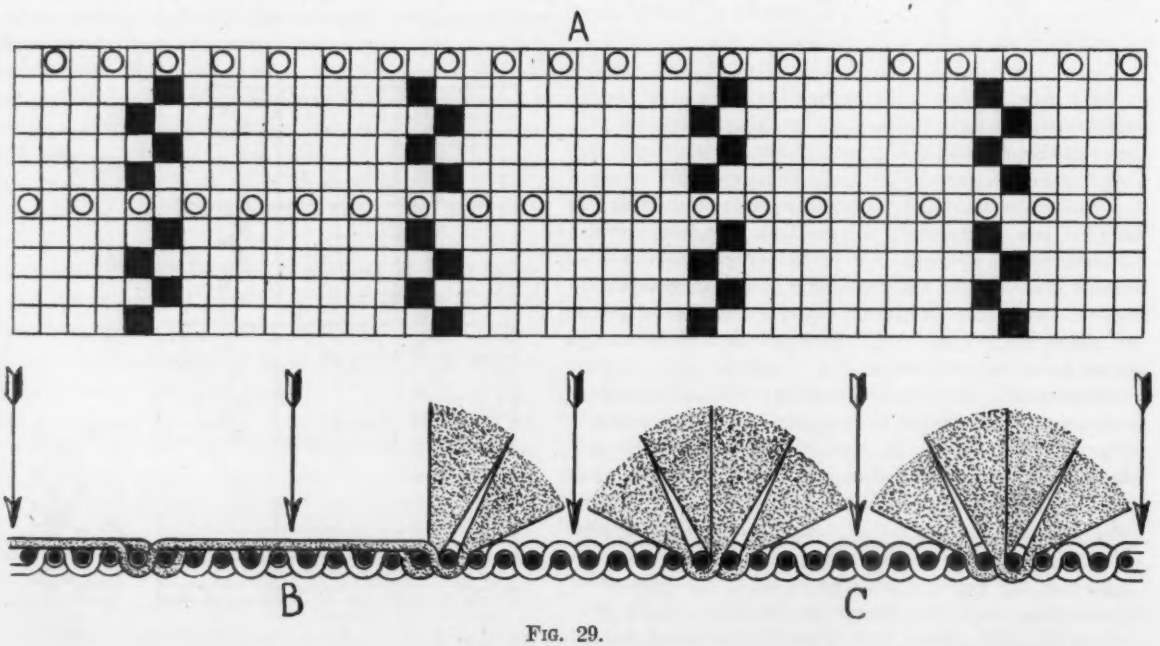


FIG. 29.

ground. The corresponding cloth is capable of being woven with 6 harnesses, using the weaving plan shown at B, and the accompanying draft C. The design and structure are similar to those described in connection with Fig. 26. This example is introduced solely to indicate how such weaves may be altered to suit any method of inserting ground and figure picks, and to produce any requisite length of float and proportionate height of pile.

Figure 29 exhibits a clear and graphic idea of the method of forming the ground fabric and of producing the rows of rounded pile tufts. Two repeats of the weave in Fig. 27, involving 40 threads, appear at A in Fig. 29. Immediately below the point-paper design A, a transverse section through the warp threads has been drawn; in this section, the warp threads are indicated by solid black circles, the ground filling is in white, and the pile picks are stippled. The left-hand unit, or so-called repeat, at B is shown as the structure would appear in the loom, i.e., in the woven condition, while the right-hand repeat at C is shown diagrammatically as it would appear after the fustian knife had passed up the races and severed the floats of filling. The arrows drawn between the point-paper design A and the intersection B show the various positions at which the knife would be inserted.

It will be seen that each particular float of filling is severed into two equal portions, but, because any two successive floats in any pick are of different lengths, and centrally disposed with regard to each other, one side of any complete tuft is a different length from the other side, and the longer limb of the tuft is nearer the center of the cord than is the shorter limb.

The illustration in Fig. 29 perhaps renders any further explanation unnecessary, but it may be useful to emphasize the fact that, with the particular weaves used, the fustian knife may be passed up the race in any position, central or otherwise, and the result will invariably be unequal-sided pile tufts. It should be noticed that in corduroy weaves, a comparatively small proportion of the warp threads, say one-third, one-fourth, one-fifth or one-sixth, is used in the stitching of the pile picks. In the example illustrated in Figs. 27 and 29, for instance, only 4 threads out of every 20 are so employed, whereas, if any of the velveteens are examined, it will be seen that alternate threads are used for this purpose.

(*To be continued.*)

Slashing Cotton Warps

BY WILLIAM B. NANSON.

Yarn on beams which are intended for "heavily-picked" goods have to remain on the loom beams for a much longer time than for lighter picked goods. On this account it is important that the size should be of such a character as to retain its strength during the whole time it is in the weave room. Sago is eminently suitable for this class of work, because it does not lose strength to the same extent as potato starch, and there is less liability to develop "soft" beams.

Sago and corn starch are very similar in their properties and action and may be mixed and used together. In both cases the mixing must be well agitated in cold water before boiling and then boiled for a long time to thoroughly gelatinize and finally boil thin the size. A little caustic soda may be used on both alike to facilitate gelatinization and both sago and corn starch gelatinize at about the same temperature. Sago, however, has a tendency to turn more watery than corn starch if kept, and should, therefore, be used continuously when made and not allowed to lie and go cold.

Softeners.

Softeners are sometimes used to give a peculiar feel to the woven cloth, but chiefly to modify the effects of the starch by acting as a lubricating agent to the sized warp on its passage through the loom. They also serve to make a more homogeneous mixture of greater smoothness.

Perhaps the most useful material for a softener is tallow which is the refined fat of animals; beef or mutton tallows being the principal ones used for the purpose. The various kinds of wax are also useful, especially paraffin wax, which is a clear and almost transparent product obtained in the manufacture of mineral oils. It should not be used, however, on goods which may afterwards be dyed or bleached. Other softeners sometimes used are glycerine, castor oil, palm oil and soap.

Soap is not a safe thing to use, but if it is used only the best should be employed and only such soaps as have colorless fatty acids. While it is frequently used as a softening and lubricating agent in sizing mixtures it is comparatively useless in hard water or mixtures containing any metallic salts; a clear white oil such as lard oil, cocoa butter or tallow is in all cases preferable to soap.

Soap forms the basis of many so-called softeners or finishing pastes. It is made by the action of caustic soda or potash on various oils or fats. When oils or fats are treated with caustic alkalis, double decomposition ensues, the glycerin is liberated and the alkali combines with the fatty acids to form soaps. If potash is used, soft soap is formed, if soda is employed hard soap results. Soft soaps contain 45 per cent of water and all the glycerin; hard soaps contain 25 per cent water and no glycerin. Therefore, buy hard soap and add water and glycerin to it rather than pay freight on the water—the glycerin is of little use in soap softeners.

The substances sold in the form of softeners are usually diluted soaps, made either by boiling ordinary soap in water until it is dissolved and allowing it to cool, or directly from fats by the cold process. The best are made from cocoanut oil or good white tallow and contain water varying from 56 to 80 per cent.

Under the name of soluble oil two distinct products are on the market. One is a strong solution of castor oil soap. It gives softer and more transparent soaps than any other fat and they are more easily soluble in water; its effect in size is very much the same as the other soaps, but a softer feel is given to the yarns.

The other variety of soluble oil is also a preparation of castor oil and is known as alizarine assistant or Turkey red oil. This substance is made by treating castor oil with sulphuric acid and then neutralizing the acid with caustic soda or ammonia. It is a most valuable softener and mixes readily with water. It softens the harshness

and stiffness due to starch and makes the yarn feel fuller and smoother, the yarn retains it for a long time when handled whereas some softeners rub off easily and will not stand. Warps are not liable to mildew when Turkey red oil is used as a softener as is the case with tallow, cocoanut oil or other softeners. It may, however, in time emit an oily smell from the goods dressed with it, which may in some cases be objectionable. Like all soaps it cannot be used along with magnesium, calcium, zinc compounds or other metallic salts.

Chloride of zinc, calcium and magnesium are sometimes useful; they are strongly hygroscopic and by absorbing moisture from the air prevent the warps from becoming too dry and brittle, incidentally they make the warps heavier. Chloride of zinc is the best and magnesium next. They soften the harsh effects of the starch and impart a full mellow smooth feel to the yarn and cloth made from it. They are, however, rather dangerous bodies to use in too great quantities. Chloride of zinc is also antiseptic, and on this account is the most valuable of the three. They may be used in conjunction with oils and fats in the sizing but will not work with soaps or soluble oil.

One of the most valuable softeners in sizing is tallow. Its main function, of course, is to prevent the other sizing materials from imparting a too stiff or harsh feel to the warps. Its use possesses the further advantage that the goods can be much more heavily dressed without losing their suppleness and without dusting or rubbing off in the weaving. It also serves to make china clay or other weighting substances adhere more firmly to the yarn. With heavy sizes the tallow may be used unmixed, but for many light sizes, it is requisite to combine it with varying amounts of fats having a lower melting point. Good tallow should contain practically no water or unsaponifiable oil and not more than 0.25 per cent of mineral matter. It is sometimes adulterated with other and inferior oils, and often contains lime soaps.

A wise slasher man will confine his softening activities to tallow, castor oil and cocoa butter—these three—but the greatest of these is good tallow. *Verbum sat sapienti.* For antiseptics I would advise carbolic acid and turpentine. Turpentine also prevents the size from frothing over.

Mixings.

This mixing proposition is a very important matter connected with sizing. There is probably no topic connected with cotton manufacturing which admits of such a variety of opinions as size mixing, both as to the proportion of the ingredients to be used and the method of making them. Almost every mill has a different mixing, and the same mill will frequently have several mixings in use for various purposes.

In considering a size mixing, the proportion of each of the various classes of sizing materials should be considered with relation to the quantity of water used. The best plan is to always reduce the ingredients of any mixing under consideration to the basis of 100 gallons of water and to consider the quantity of dry starch, softener, weighting matters, antiseptic substances and other ingredients that are to be used to this 100 gallons of water. All ingredients should be carefully weighed except the starch and the water and these should be measured for reasons already given in these articles. An exception to this, however, may be made in the case of china clay. This substance, when used in sizing, must be well boiled in water before being run into the mixing and as it is known how many pounds of clay are contained per gallon of water all that is necessary is to add the number of gallons containing the pounds required to the mixing. This clay mixture must in all cases be poured through a fine sieve into the mixing to eliminate all lumps.

The slasher man must also consider the following points when figuring out his mixings: That ply warp can be woven with little or no size at all. That single warp yarn of a medium number and a light sley and pick can be woven with a minimum of size. A warp with a fine reed or with a heavy pick must be sized more heavily. A warp with a fine, hard twisted yarn, especially Egyptian, requires a stronger mixing than a medium yarn. A very coarse warp being loosely twisted, tends to fray in the loom more easily than a yarn of medium counts and twist, and this requires a stronger size. Therefore, the following fundamental principles may be said to govern all cases:

(1) A size mixing should be weakest and applied with the smallest percentage for medium yarns (from 20s to 40s) and for a cloth of light sley and pick; (2) if the cloth is woven with a heavy sley and pick even with the same numbers the mixing must be made stronger; (3) if the yarn is very fine, the mixing must also be made stronger; (4) if the yarn is very coarse, but light twisted, the mixing must be made strong. Taking yarns 20s to 40s, for instance, for a light sley and pick, 30 pounds of starch, four pounds of softener; for a heavy sley and pick, 40 pounds starch, five pounds softener; (these proportions are for 100 gallons of water). For 10s to 20s and 40s to 60s for a light sley and pick, 45 pounds of starch, five pounds softener, and a heavy sley and pick, 65 pounds starch and seven pounds of softener; in all cases one pint of turpentine may be added to each 100 gallons. These are merely illustrations, not recipes.

The slasher man must remember that climatic conditions and atmospheric conditions and the location of the weave room and the class of goods being made will necessitate modifications of the size mixings. It is better to err on the side of making the mixing too strong rather than to run a number of warps so soft they will not weave. More starch in proportion to the amount of water stiffens the size and a heavier percentage can be obtained. More softening materials in proportion to the starch and water make the warp more pliable and removes the harshness.

So far as the question of sizing for weight is concerned, the same principles regarding the varying proportions of ingredients according to the numbers of the yarn and the sley and pick are concerned hold good, but the mixing must be much stronger both in starch, softeners and weighting materials. The following is a sample of an English mixing which is supposed to add 50 per cent to the warp. Water, 100 gallons; wheat flour, 320 pounds; china clay, 150 pounds; tallow, 40 pounds; chloride of magnesium, three gallons; chloride of zinc, one gallon; soda ash, five pounds. These ingredients are sometimes nearly doubled for 100 or 150 per cent addition to the weight. This system of sizing does not accord with the ideas of the writer at all.

A mixing that suits the writer for a medium size would be 150 gallons water; 70 pounds starch (pearl); 1½ pints turpentine; five to seven pounds tallow. Boil until thin

or one hour if necessary. For ordinary size making, the mixing should be made as follows: Cold water is first run into the mixing kettle. This water must be less than the total volume of finished size will be, so as to allow for the expansion of the mass by heat and condensation of the steam used in boiling. The starch is then measured, not weighed, (see next paragraph) and thrown in, the agitator being started at the same time. After agitation for fifteen minutes the steam is turned on. The steam pipe must be large, at least 1¼ inches or larger, coming within three inches of the bottom with an elbow at the bottom set at such an angle as to blow the mass of starch and water around in the same direction as the agitator, but at a slight angle or tangent to it, so as to insure a thorough mixture. In the case of corn starch, to which we are now referring, the starch must be boiled until thin, or from one-half to one hour in length, and then the softening and weighting materials added and the whole boiled up again until thoroughly homogeneous. Potato starch or other modified corn starches do not require boiling so long. In fact, to boil potato starch after it has once boiled thin converts it into dextrin and sugar, which spoil it for warp sizing.

After the boiling is finished the size should be run into a storage kettle and kept hot by means of a steam coil or steam jacket to avoid thinning by condensation. I would say here that each lot of starch bought by the mill should be of the same grade and the grains of the same size. The *first mixing* made from it should be *weighed* and its measure noted—afterwards measure out the starch from all of that lot without weighing. Do this with each carload or fresh lot.

Starch granules gelatinize before the mixture reaches the boiling point, but in order to thoroughly disintegrate the starch particles and produce a uniform size it is necessary to boil the mixture thoroughly and therefore it is advisable to boil the mixture not less than one hour. However, if the steam used for boiling is "wet" the condensation of the steam during an hour's boil will make the size too thin and therefore the steam should be trapped before it enters the kettle.

A great many attempts have been made by slasher men to so modify starch that it will give improved results in sizing and weaving. All or most of these are in the direction of producing a thin boiling mixture, said thin boiling mixture being distinctly advantageous if it can be produced without interfering with the adhesive qualities of the size. It has been the experience of the writer, however, that where such modifications have been attempted by the slasher man in any other way (i. e., chemically) than by boiling the results are unreliable and lead to trouble. The active principle or cause of the starch boiling thin (soluble) is the production of dextrin and sugar in the size and where the size is modified chemically the production of these substances is beyond control except in the case of diastase (diastafor) and prolonged boiling. Prolonged boiling converts some of the starch into dextrin; this conversion may be stopped by stopping the boiling. In the case of diastafor the action may be stopped by the addition of a little alkali to the size as soon as liquifaction has taken place or by raising the size to a boil. In all cases the production of dextrin is the liquifying agent and practically the same result may be obtained by adding dextrin to the mixing in the first instance. Dextrin is of very limited use in sizing. It will not stay on the yarn and makes it go soft and spongy and the chemical treatment to which starch is subjected to produce dextrin destroys largely the essential properties which make it of use for the strengthening of the yarn, and no amount of theory will ever make dextrin suitable for sizing cotton yarn. Should some process for the manufacture of thin boiling (soluble) starch be devised which would allow it to retain its adhesive and strength giving properties, there would be quite an advantage gained, and any experiments carried out with this object would be well directed to corn starch which lends itself more to successful chemical treatment than any other form of starch.

It is the opinion of the writer, based upon a wide experience, that, with the exception of the action of the alkalis, such as caustic soda or potash, there is no treatment which the slasher man can employ whereby starch is rendered more suitable for sizing purposes, except in very special cases, where some special effect is desired, other than by boiling in a suitable manner and using the variety of starch which is suitable for the particular purpose in hand.

A mixing should be either neutral or slightly alkaline, and should be tested for this with litmus paper before boiling up. When a sulphurous acid process has been used in the manufacture of the starch or the starch has been modified into a so-called *thin boiling* starch by the action of hydrochloric acid, free acid is sometimes present and this must be neutralized with a little soda or the warp may be tendered; in any event continued boiling of starch slowly changes it into sugars that are soluble in water and these sugars have little value as stiffening agents and this action is very materially hastened if acids are present in the starch; hence, it is obvious that too much boiling of a chemically modified starch is a bad thing for it.

The cooking of the size is an operation requiring good judgment and careful attention. Pure corn starch (pearl) should be boiled a long time, until a portion of it is converted into dextrin and sugar which make a thin boiling starch of it which changes very slowly after further and prolonged boiling, especially if a little soda be added after the starch has boiled thin; while potato and modified thin boiling starches may become completely dextrinized if overboiled and thus rendered unfit for sizing purposes. Probably the most important thing about slashing is the proper and judicious control of the temperatures of the cooking and the application and the drying of the size.

With regard to this, I may say that the rule should be to cook the size mixture at a boil only until it is thin, and then cool it down to 175 degrees F. or 185 degrees F. and apply it at this temperature and dry it as cool as possible on the cylinders compatible with dryness.

Practically, from a slasher man's viewpoint, the size in the size box should be kept hot enough to prevent skimming over and thin enough so as not to cause creeping of the covering of the slasher rolls or "picking up" on the drying cylinders. Again, if kept too hot it will be thinned by condensation of steam, if open steam is used.

I give herewith formulae and comparative breaking and weight tests of 14s and 30s yarn by pearl starch and commercial thin boiling starches. These tests were made by the late G. M. MacNider, the starch expert.

NUMBERS 15s YARN.

Pearl Starch	Thin Boiling Starch
123 gallons water	123 gallons water
80 pounds Pearl starch	123 pounds thin boiling starch
8 pounds compound	18 pounds compound

The pearl starch gained 5.67 per cent in weight and 4.5 pounds in breaking strength.

The thin boiling starch gained 10.83 per cent in weight and 11.6 pounds in breaking strength.

NUMBER 30s YARN.

Pearl Starch	Thin Boiling Starch
120 gallons water	120 gallons water
90 pounds Pearl starch	120 pounds thin boiling starch
7 pounds compound	8 pounds compound
3 pounds tallow	7 pounds tallow

The pearl starch gained 8.61 per cent in weight and 3.6 pounds in breaking strength.

The thin boiling starch gained 14.1 per cent in weight and 6.3 pounds in breaking strength.

It will be seen from these tests that the showing in favor of the thin boiling starch is a good one, even though it took more starch and softener to do it, but we are told that the warps sized with the thin boiling size ran so much better and produced so much more cloth from the looms in a given time that the extra cost of the mixing was more than worth while.

The tests just given were made with an ordinary size box, heated in the ordinary way with an open steam pipe, and tended by an ordinary slasher man with the ordinary experience. After putting an expert on and reducing the temperature of the size in the size box to 171 to 175 degrees F., the breaking strength of the 30s yarn was increased by 3.2 pounds. The increase in weight was inappreciable but the weaving showed a marked improvement.

The writer has found that a good size for a 14s to 16s yarn is: 120 gallons of water; 70 pounds pearl starch; boil thin or about one hour, then add 1½ pints turpentine and seven pounds tallow or castor oil; boil up well, and if the goods are to be weighted with china clay, previously boiled, or other weighting material, it can also be added to the size at this paint, care being taken to continue agitation and boiling until the mixture is thoroughly homogeneous.

There are two systems used in circulating the size to and fro from the mixing kettle to the size box, and one or the other should be used. In one system the size is circulated through parallel pipes above the size box and the size is drawn out into the box as it is needed; in the other system the size is circulated through the size box and the size is kept at a constant level in the box. This latter is the system which should be used. In either case, it is better to have, in addition to the cooking kettles, a storage tank which is either steam jacketed or fitted with a steam coil for keeping the size hot, the size box must be fitted in the same way and the size kept at a temperature of 175 degrees F. The gravity system of feeding the size to the size box is a poor thing. In any circulation system the size must be delivered to the size box through a wire strainer because, during the run, the size becomes full of lumps and motes and threads and lint which must be removed as the size circulates.

The size box and all pipes leading to and from the kettles, and the kettles themselves, must be blown out with steam and thoroughly cleaned out at the close of each day's run.

I would state here for the benefit of the uninitiated, that the china clay referred to is not always introduced into the mixing merely as a weighting agent, but that its unctuous and soft nature is valuable in giving a smooth soapy coating to the warp which materially assists the weaving, but its greatest merit lies in the fact that it gives a fuller and better feel to the woven cloth in that it prevents that too powerful shrinkage of the size when dried on the hot cylinders, which has the effect of shrinking and contracting the yarn. It should not, of course, be used on goods that are to be subsequently dyed or bleached.

In conclusion, I will say that probably the most important points about slashing are: the judicious control of the temperature of the cooking and also of the application and drying of the size; the rule should be to cook the size at a boil only until it is thin and then let it cool to 175-180 degrees F. and apply it at this temperature in the size box, and then dry it as cool as possible on the cylinders—compatible with workable dryness—strictly speaking, the warp should not be dried *bone dry*, but should contain seven to ten per cent moisture as a conditioning agent.

(This is the fifth and last article of the series on "Slashing Cotton Warps" by Mr. Nanson.—The Editor.)

Bleaching and Related Processes.

This is the title of a new book on bleaching by Dr. J. Merritt Mathews which has just been published and is now ready for distribution. Dr. Matthews has written this book primarily for the textile chemist and practical mill man, and so has avoided the use of complicated chemical formulas and equations that might mystify and confuse the practical reader, and has dealt with the subject from a practical rather than a theoretical viewpoint.

Textile fibers constitute the greatest field for the practice of bleaching, and among these cotton is the one of preeminent importance and therefore receives the major portion of consideration in this volume, which, in discussing the subject, deals with the materials to be bleached rather than with the bleaching agents themselves. However, while cotton and other textile bleaching is treated as the main theme in this volume, there is also included a discussion of the topic of bleaching as extended to other fields of industry, such as straw, paper pulp, leather, bone, ivory, horn, feathers and sponges.

The author of the book is well known as an authority on bleaching subjects, and he has utilized in the preparation of his new book his practical experience, extending over more than twenty years, as a textile chemist occupied very largely in the problems of bleaching. He, therefore, is equipped to prepare a treatise on this subject that will appeal to the practical man, and he has made use of his own experience in eliminating unnecessary and extraneous features and including those necessary to make the book a thorough discussion of the subject, and one that should serve as an incentive toward a greater interest in the systematic investigation of actual mill processes and operation. The publishers are the Chemical Catalog Company, Inc., 1 Madison Avenue, New York, and interested readers may secure copies through the Book Department of COTTON. The price is $8 per copy.

BEFORE AND AFTER THE INSTALLATION OF A SUITABLE LIGHTING SYSTEM IN THE WEAVE ROOM OF A SOUTH CAROLINA MILL.

Reflecting Equipment.

The history of artificial lighting shows that man has ever been aware of the annoying effects of brilliant light sources. The development of each new and higher efficiency artificial illuminant has been followed by some sort of a shade or shielding device. In the days of low efficiency illuminants, the brilliancy was only enough to cause annoyance to the eyes, but with the development of the modern high efficiency and concentrated sources of light, this annoyance has developed into the actual menace of glare. Happily, it is possible to combine the vision-conserving benefits of a shield with the economical advantages of a reflector.

A careful inspection of the distribution of light from a bare lamp will show that a generous portion is emitted horizontally. Most of that part of the light in the down ward direction, Fig. 1, will strike the work directly, and even some of the light in the upper angles will be reflected if it strikes a light colored ceiling, but a large part of the light in the unshaded zone shown in the angles near the horizontal, will strike neither work nor ceiling and will be wasted out of the windows or lost among the columns and belts. It is also this uncontrolled, unshielded raw light glaring into operatives' eyes which causes fatigue, headaches and ruined eyesight.

*Reprint of a Paper presented before the Boston Section of the Illuminating Engineering Society.

A well designed reflector should furnish two things to the user of incandescent lamps—eye protection and lighting economy. Accordingly, such a device should catch that large portion of the light which is emitted in the upward and horizontal directions, and direct it to the working plane where it will be useful; it should also have a sufficiently deep shielding angle to minimize the glare from the bright lamp filament as much as possible.

One of the earliest reflectors was the shallow cone, the application of which today is limited to exterior lighting. Reflectors of this type should not be used for interior lighting, since they have neither of those qualities which make reflectors desirable—they do not catch and reflect the major portion of the useful light, nor is the shielding angle large enough to eliminate harmful glare. Another reflector of this general type was the flat disk which was largely used for interior lighting but which merely served in a small way to substitute for an equal area of ceiling surface; a higher illumination level of better quality can be obtained with other types of reflectors.

Two later types of reflectors—the shallow dome, and the deep bowl—were designed for use with the vacuum or Mazda B lamps. These two types of reflectors served to redirect the light and eliminate glare as long as Mazda B lamps only were used. However, when the more efficient concentrated filament Mazda C lamps were made available, the shallow dome became inadequate because of an insuffi-

cient shielding angle resulting in glare and wasted light in the horizontal angles; the deep bowl, on the other hand, had an adequate shielding angle, but the close fitting reflector caused much of the light to be pocketed, resulting

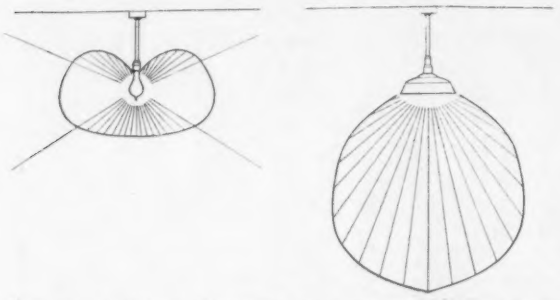


FIG. 1. A WELL DESIGNED REFLECTOR UTILIZES OTHERWISE WASTED LIGHT BY DIRECTING IT INTO THE USEFUL ANGLES.

in a relatively poor efficiency.

After a thorough study of the requirements, the principal manufacturers of metal reflectors and the engineers of the Mazda lamp manufacturers evolved a standard design which virtually combines the advantages of both the the old dome and bowl types without many of the disadvantages. The angle of cut-off in the new dome is somewhat greater than that of the old shallow form of dome, thus giving added protection from direct glare. The new dome is also made in large enough diameter so that there is not the same tendency for pocketing the light as in the deep bowl type reflector. This gave an appreciable increase in efficiency over the old bowl. This new reflector, called the RLM (Reflector and Lamp Manufacturers') standard dome, Fig. 2, is made with a standard diameter and light output, by most of the reflector manufacturers. With this unit available, the possibilities of standardized illumination in any industry are apparent.

There are three finishes commonly used for the reflecting surface of metal reflectors—aluminum paint, white

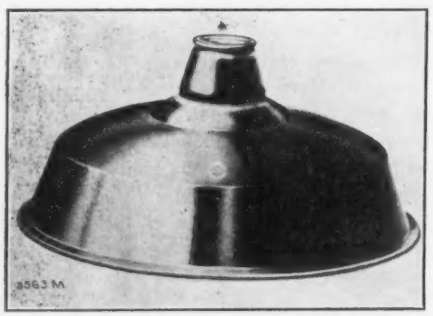


FIG. 2. REFLECTOR AND LAMP MANUFACTURERS STANDARD DOME.

paint enamel, and porcelain enamel. Paint enamel and aluminum paint have a tendency to discolor, crack and peel in the humid cotton mill atmosphere. Porcelain enamel, however, is permanent, and reflectors so finished should be used for all installations except those of a very temporary nature. The RLM dome is made only with the porcelain enamel finish.

Recently, a reflector has been designed (Fig. 3) which retains the shielding angle and reflecting qualities of a porcelain-enamel dome, with some of the advantage of a

FIG. 3. THE OPAL CUP AT THE TOP ALLOWS SOME LIGHT TO GO TO THE CEILING.

glass unit in that it allows a small portion of the light to be transmitted in the higher angles. Another recent design in reflectors of this type, Fig. 4, combines the shielding effect of a porcelain-enameled steel reflector, with the diffusion obtained by an enclosing opal glass globe which surrounds the lamp. As sufficient eye protection is obtained by the diffusing glass globe, clear bulb Mazda lamps may

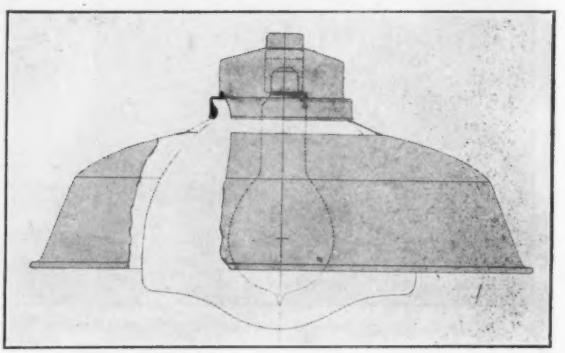


FIG. 4. INDUSTRIAL REFLECTOR OF GLASS AND PORCELAIN-ENAMELED STEEL.

be used. Reflectors of this type are effectively used in many places where the dark materials reflect very little light upward, and where light is desired near the ceiling so that pulleys, belts, and oil cups may be easily seen.

Diffusion in the unit Fig. 5, is obtained by the use of a relatively large diameter reflector and by enameling the bottom of the glass cylinder which surrounds the lamp. This enclosing cylinder is also used to keep lint and dirt from settling on the upper shoulder of the lamp bulb.

The light from glass reflectors may be obtained by one or more methods—reflection, refraction and diffusion.

Prismatic glass units, Fig. 6, may be designed to control and redirect light into spread or concentrated distribution

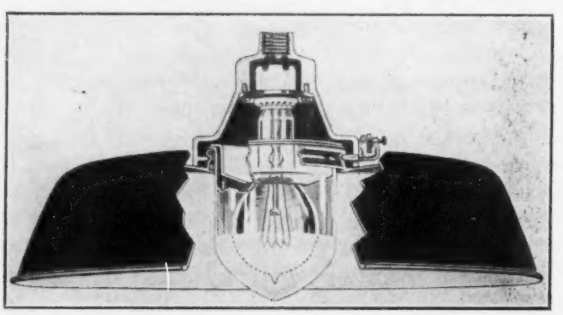


FIG. 5. DIFFUSER HAVING THE LAMP ENCLOSED BY A GLASS CYLINDER.

as desired, is the light which is allowed to go to the ceiling. Although prismatic reflectors are glass and naturally breakable, the tendency of the prisms and bottom rim is to reinforce the structure thus making them more rugged than ordinary glass units. It is possible to interchange the spread or concentrating distribution in prismatic units, by raising or lowering the reflector on the stem.

Opal glass reflectors, Fig. 7, allow a large or a small amount of light to be transmitted to the ceiling according to the density of the glass. Dense opal reflectors with bowl-enameled Mazda C lamps will give better illumination results than light density opal reflectors would.

Many mill architects and superintendents feel that the breakage of glass reflectors is not excessive because the em-

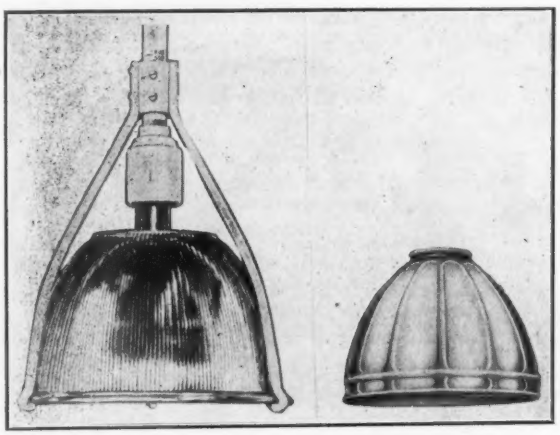


FIG. 6, ON THE LEFT, IS A PRISMATIC GLASS REFLECTOR AND FIG. 7 ON THE RIGHT IS AN OPAL GLASS REFLECTOR.

ployees are naturally more careful when working with them, than they would be if working with steel reflectors. In general, there is little danger of glass reflector breakage where there are no belts or overhead shafting.

Mirrored glass reflectors have a high efficiency and accurate control of light. In general, they are more suitable for very high ceiling bays than for the lower ceiling heights found in the average cotton mill. These units will be found desirable for use at mounting heights allowed for open reflectors using clear Mazda lamps. In some weave rooms and knitting mills, totally indirect lighting systems are in use. For this purpose, mirrored glass reflectors are found very efficient. Since this type of lighting directs all of the light from the reflector to the ceiling, the success of the system depends largely upon the good reflecting qualities of the painted ceiling to reflect and diffuse the light to the work. Naturally more wattage must be expended and maintenance furnished to obtain a certain foot-candle level of illumination, however well designed shadow and indirect lighting systems are conspicuous by their absence of glare and shadows.

Switching Groups.

The proper arrangement of circuits and groups of lighting units controlled by switches may be made an item of lighting economy, as well as one of convenience. Too often the mill owners allow the attractions of a cheap wiring system to outweigh the consideration of convenience and final operating cost. The result is a lighting system which compels the use of light in places when it is not needed in order that those employees requiring light may have it. An example of this is the old practice of switching lighting circuits at right angles to the work aisles and at right angles to the rows of windows, rather than parallel to the work aisles and windows.

The first consideration in arranging the switching of lighting units, is that of departments. It is often necessary to run some departments, such as carding, at times when the others are not in operation. For this reason, it should be possible to light the lamps in that department without finding it necessary to burn those in some other department.

Some artificial light is generally needed during the day in the center aisles of carding, spinning, twisting and weaving rooms, especially in wide buildings of two stories or more in which the work aisles run lengthwise of the room. Convenient switching groups will allow the dark aisles to be flooded with light without finding it necessary to burn lamps in the aisles nearer the windows. It is the most reasonable and economical practice to have switch-controlled groups of units in strings parallel to the rows of windows, and parallel to the work aisles. Fading daylight can then be compensated for by turning on rows of units nearer and nearer to the windows.

Methods of Suspension.

The days of open wiring and drop cords are passing, and mill owners are installing their wiring in the more modern conduit construction and using some form of conduit suspensions. Conduit makes a better installation job than open wiring, and in addition to being required in some cities, its use always tends to lower the insurance rates on a building.

Regardless of the fact that the tendency in lamp manufacture is to make stronger and stronger filaments, there are extraordinary shocks to which the lamp may be subjected, that will rupture the filament. It is evident that rigid conduit will neither absorb these shocks as well as

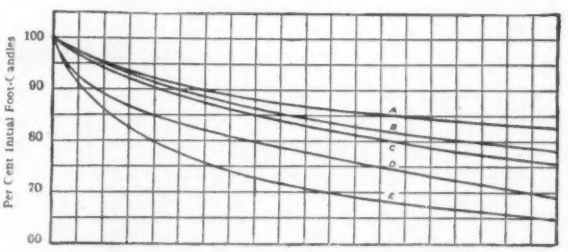


FIG. 8. THE EFFECT OF DUST ON LAMPS AND REFLECTORS ON THE ILLUMINATION INTENSITY.

A—Dome Enameled Steel
B—Bowl Enameled Steel
C—Dense Opal Glass
D—Prismatic Glass
E—Light Density Opal Glass

flexible drop cords, nor allow the reflector to swing when struck with a belt or during the process of sweeping down the walls and ceilings. Several methods of suspension are being used which employ rigid conduit, and yet approximate the flexibility of drop cords. A common method is to fasten the reflector to a short piece of conduit having a loop hickey at the top. This is then placed over a wood hook in the ceiling. In the others, fixture joints are used which act somewhat like a universal joint in that they allow the conduit to hang vertical, and due to the construction will absorb as much vibration as the hickey and hook arrangement. These latter have the added advantages that

the wire is carried through the joints thus giving it protection.

Maintenance.

The proper maintenance of the lighting system in a cotton mill or knitting mill is an important problem, and one which should receive the serious consideration of every mill executive. Tests are on record of lighting installations which have an installed wattage sufficient to give an illumination of seven foot-candles, while the foot-candle meter reads only two. Such uneconomical conditions are the result of dirty reflectors, walls and ceilings darkened by dust and dirt, blackened lamps left in service as long as they continued to burn, empty sockets, unobserved burnouts, or replacements made with lamps of the wrong size or improper voltage rating. A good practice is to select reflectors which are easy to maintain or which have their important reflecting or transmitting surfaces in such a position as to prevent any undue collection of lint or dirt. The normal collection of lint or dirt does not affect all

WARPING REQUIRES A HIGH LEVEL OF WELL DIFFUSED ILLUMINATION BOTH AT THE BEAM AND CREEL.

types of industrial reflectors alike. The curves in Fig. 8 show the rapidity with which some of the types of reflectors commonly used in cotton mills depreciate in resultant illumination due to the collection of dust and lint. These results are comparative because the tests were made with actual installations under like atmospheric conditions. It is reasonable to expect that the porcelain-enameled steel reflectors will suffer less with dust collection than the glass units which must throw a part of the light through the upper surface and through the dust collected on the outside.

The foot-candle meter may be of valuable assistance in properly maintaining an illumination system. Periodic foot-candle readings taken at test stations throughout the mill, when recorded in such a way as to make them comparative, will serve as an index of the performance and will show any eccentricities of the system. Any well designed system makes a normal allowance of 30 or 40 per cent depreciation of light. This is caused by a slight lowering of light output from the lamps due to age and due to a normal collection of lint and dirt. In dirty locations more allowance is made than in the clean ones. This allowance, however, assumes that the units will receive a regular cleaning according to some such schedules as listed under the next heading. Any one familiar with operating costs knows that there is a point in the cost of operating a lighting system where it ceases to be economical to burn lamp wattage which is being absorbed in dirt, and where it pays to spend man power in cleaning the units.

Economically, it is much better to institute a regular system of cleaning and maintenance than to allow for an extra large depreciation in the original installation resulting in the use of higher wattage lamps than is necessary.

Many mills have a compressed air system available. It has been suggested that the compressed air nozzle could be directed into each of the reflectors at least once a day. This would loosen the light accumulation of lint from the reflector and lamp surface and materially assist in keeping them working at a good efficiency. This plan, however, would not keep the units permanently clean and some other cleaning schedules would be needed in which soap and water play an important part. Experience has shown that it is better to wash the lamps and reflectors, than to just wipe them off.

Those mills not able to use compressed air for cleaning their lighting units should adopt some such cleaning schedule as follows:

Location Process	Interval in days if Units are Wiped Out*	Interval in days if Units are Thoroughly Washed
Picker Room	7	10
Card Room	7	10
Spinning Room	7	10
Spooling	7	10
Twisting	7	10
Warping	7	10
Cloth Room	15	20
Office Bldgs, (Separate from mill)	30	40

*Washing every third or fourth interval assumed.

The American Moistening Company announces that from January 1st, William G. R. Braemer, of Philadelphia, becomes chief engineer of the company, with headquarters in Boston, and will serve in an engineering capacity. Mr. Braemer is a pioneer in this field, and is an inventor of numerous United States and foreign patents in connection with air washing, humidifying, dehumidifying, cooling and drying systems. For nine years he was in charge of this branch of the business of Warren Webster & Company at Philadelphia, and for the past three and a half years, has been engaged as consulting engineer, specializing in air conditioning. He is a member of the American Society of Mechanical Engineers, a member of the American Society of Heating and Ventilating Engineers, in which he is particularly active at present, being chairman of the National Committee of Legislation, and organizer of the Philadelphia Ventilating Commission. Mr. Braemer is a graduate of the College of Technology of Copenhagen, a practical mechanic, and previous to organizing the air conditioning department of Warren Webster & Company, was for over nine years chief engineer of the Buffalo Forge Company.

The 112th meeting of the National Association of Cotton Manufacturers will be held at the Hotel Somerset, Boston, Mass., on April 26, 27 and 28, 1922. A program of great interest to the industry is promised and all manufacturers interested in the work of the northern association are urged to be present.

Hydro Extractors—Their Use and Abuse

BY HARRY H. STEPHENS.*

Numerous articles pertaining to centrifugal hydro extractors have been published, presumably for the guidance of users of high speed apparatus, but in most cases the major portion of the article was given over to a discussion of forces and stresses involving complex technical formulae, thus greatly impairing its value for the busy plant manager or superintendent who has little time to wade through such figuring and usually cares less, as he feels that if the extractor is properly designed he need not worry, as that is up to the extractor manufacturer.

From reports of insurance companies we can trace the cause of many extractor difficulties down to: (1) Personal element; (2) basket deterioration; (3) neglect; (4) improper loading; (5) defective materials; (6) fatigued materials; (7) excessive speed; and (8) ignorance.

Personal element. This is by far the most important cause of any, for it embraces every person that has anything to do with the extractor from the time it is designed down until it is scrapped. The designer must be competent. The manufacturer must see that these specifications are lived up to and make constant tests to be sure material is as specified. The purchaser is responsible in the selection and buying of an extractor to secure a machine that will safely and satisfactorily do this work, and therefore his selection must be governed, within reason, first, by quality, then by price.

Basket deterioration. All baskets deteriorate with use as far as physical strength is concerned, for the constant vibration to which these are subjected sooner or later will result in a weakening due to crystallization of the basket material. In addition to this, baskets that are used in contact with certain chemicals are subject to erosion by the chemicals. Unless temperatures are high, say over 90 degrees C., and unless the basket is subjected to severe handling, a method sometimes used is to coat the basket with hard rubber. However, even a fine crack in the vulcanized rubber will admit acid which may cause eating away and weakening of the metal under the rubber. This cracking can be detected by applying an electrical test of about 2,000 volts to every portion of the basket when new, and this same test should be applied about once every three months to detect any flaws that may have occurred in use. In the matter of rubber covered baskets, only very stiff baskets should be used.

Many failures of rubber covered baskets are due to the type of centrifugal in which the basket is run, and the worst offender is the old style extractor or whiz, of which there are many still in use, especially in the silk throwing and dyeing and finishing trades. This extractor is constructed with rigid or fixed bearings, one bearing above and one below the basket; the outer casing being fastened securely to a large concrete foundation in the belief that by bolting such a machine down tight, it is made safe. In reality, the machine is made more dangerous by being fastened down tightly to a foundation because the basket, even when badly out of balance, is compelled to rotate around a fixed center setting up tremendous strains in the basket, springing and distorting it out of shape. The result being that with a rubber covered basket this continual springing of the basket out of shape very quickly cracks or ruptures the rubber coating and then the damage is done, for with an acid eating away and weakening the basket wall, the extractor soon becomes a dangerous machine to run. It, therefore, follows that a self balancing extractor is the better type for uses where rubber baskets are necessary.

Neglect. This is chiefly in evidence in connection with the operation and maintenance of the extractor. The writer has been in textile plants and seen extractors in constant operation that were without question absolutely dangerous, and to run a machine in such condition is nothing short of criminal. He has seen repairs made on baskets where old material was used to save a few dollars, when the only fair thing to have done, both to themselves and to their employees, would have been to properly rebuild the basket. Yet the plant superintendents were apparently satisfied to run a little longer with a defective basket.

Improper loading. It cannot be disputed that any extractor will operate more efficiently, be freer from breakdowns, and have a longer life, if it will run free from vibration, for constant vibration will surely wear down and eventually destroy any piece of mechanism. When the extractor is completed by the manufacturer it is usually subjected to a running test for balance and if properly erected the extractor will run smoothly if properly loaded. It is extremely important, therefore, that care be used in loading baskets evenly. The practice of loading two heavy bags of piece goods in a large basket directly opposite one another should be prohibited and the load should be spread more evenly around the basket because no extractor baskets are designed to carry a concentrated load at two points and this will spring the strongest basket out of shape and may cause a basket failure.

Many persons believe that the so-called "self-balancing" extractor will overcome all uneven loading. This is a greatly mistaken assumption. In the first place, the term "self-balancing" as applied to extractors is a misnomer. No centrifugal possesses any real self-balancing features for that would mean ability to run with excessive out of balance loads. "Self-balancing" extractors are self-balancing only by virtue of the character of load in the basket. If it is a non-flowing or not a self-adjusting load, like textile material, the machine will vibrate if not loaded evenly. On the other hand, in chemical work, like the handling of salt or sugar where the load has a tendency to evenly distribute itself around the basket during the starting period, then the so-called self-balancing extractor merely accommodates itself to the uneven load during starting. It is extremely important also that the extractor must not be overloaded beyond the amount the basket was designed to carry at the operating speed.

Defective materials. This has to do with the selection and use of proper materials in the extractor baskets, spindles and bearings as originally made by the extractor manufacturer, and also just as important on the owner's part, the proper use of suitable materials in making repairs or

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replacements.

Fatigued material. It has been proven by actual tests that when most materials are stretched in use beyond their elastic limit, that naturally with the reduction in sections, the strength of that metal is considerably reduced. Now this is exactly what happens when you try to repair or reshape an extractor basket whose well or drum has stretched or bulged in operation. It is common practice to hammer a drum back into shape; but no amount of hammering can restore that strength.

Excessive speed. This may be caused either intentionally or unintentionally. Most persons do not appreciate the tremendous increase in the metal stresses of the basket caused by an apparently slight speeding up. For instance, if the speed on a 42-inch extractor, which normally runs at 850 r.p.m., be increased to 1,150 r.p.m. (only about 40 per cent increase) the basket strains are doubled and the factor of safety cut in half. In many textile processes there is a remarkable gain in economy of subsequent handlings if the extractors are run at comparatively high speed and there is a great tendency towards higher speeds than were formerly used. This is all right if the extractors are properly constructed for these abnormal speeds, but it is a dangerous proposition to promiscuously speed up old machines without the advice of a competent engineer.

Steam engine driven extractors are likely to give trouble on account of excessive speed when their governors have been tampered with or, as is sometimes the case, removed altogether. This puts the control of speed too much in the operator's hands; it is not only dangerous but gives a product that is anything but uniform. The engine should be of suitable size to drive the extractor with the minimum steam pressure, and a positive pressure regulating valve should be placed in the steam feed line beyond the operator's reach, so as to preclude the possibility of excess speed.

Extractors are often operated at a greater speed than necessary due to the mistaken assumption that equal peripheral speeds develop equal centrifugal forces and consequently give like drying effects. To disprove this imagine yourself in a railroad train, traveling at, say, 60 miles an hour. You will hardly notice going around a very gradual curve, but if the engineer attempted to take a sharp curve at the same high speed you would probably find yourself trying to go out of the window. Here is a case of equal peripheral speeds where centrifugal forces are entirely different, demonstrating that centrifugal force is proportional to angular velocity, not peripheral speed. It varies directly as the size of the basket and weight of load, but as the square of the speed.

Ignorance. Most employers expect to and usually do trust the actual operation of their hydro extractors in the hands of an unintelligent class of labor. Therefore, if the owner admits his help are ignorant, he must not expect them to act otherwise, and for obvious reasons he should not place in the care of such help any apparatus that will require thinking on the operator's part. He must, therefore, furnish the operator with an extractor that cannot be run at excess speed and one in which the operations are so simplified that he does not have to think. If the owner does otherwise, he is acting in direct opposition to what he admits to be a correct and logical handling of the matter, and he is putting in the hands of unskilled or reckless workmen a chance to jeopardize lives and property. Many accidents are the direct result of recklessness or skylarking on the part of the employees together with the inborn curiosity in all human beings to see what happens if they try something new.

Another brand of ignorance is thoughtlessly changing the speed of shafting which drives extractors as well as other machinery.

On the other hand, extractor manufacturers are greatly to blame for the ignorant handling of their extractors by manufacturers and operators. It seems almost incredible that any manufacturer would market a piece of high speed machinery like an extractor without fully informing the operator in an effective way the maximum conditions under which the extractor should be run. Surely excess load and speed is the cause of many accidents and yet some users are absolutely ignorant of what the limitations of their extractors are in speed and load, and they consequently make changes to suit their operations, trusting more to good luck than to good management.

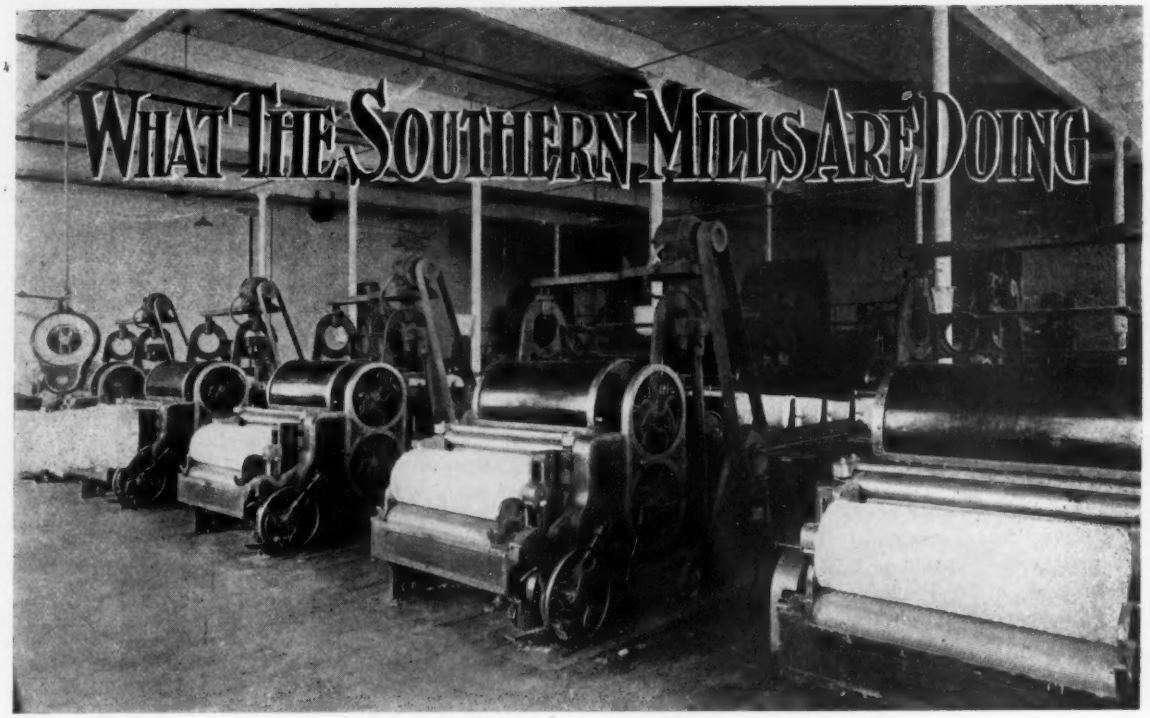
Yet another case of ignorance is found in the practice of having extractors repaired or baskets rebuilt in shops not fitted either in equipment or in knowledge for such special work. It is a dangerous practice to have a boiler shop that knows nothing of basket design repair a basket, for the results and risk involved are not justified by the few dollars possibly saved. Such shops cannot know what is required and cannot be expected to produce safe baskets. Making one basket look like another does not insure its being of the same strength, and it usually pays in the end to go to the concern that originally made the extractor for any repairs or new parts.

Ignorance in applying the extractor to the job is often caused by the customer in his anxiety to keep his process secret, giving the extractor manufacturer the scantiest of information. The result may be that of a customer asking for an extractor to perform quite an impossible task or a manufacturer supplying an extractor which is afterwards found to be unsuitable.

To most persons an extractor is only a machine that rotates quickly; they do not realize the tremendous energy stored up during operation and how fraught with possible danger the operation of these machines may become if they are run carelessly. While accidents will happen even in spite of the best of intentions, yet we must realize that if accidents become too numerous, the next step toward prevention will be extreme legislation that may impose great burdens on owners through unwarranted restrictions, requirements, etc. Therefore, let manufacturers produce only extractors that are as good as they can possibly be made and let purchasers buy only the best and keep them in the best of condition. Then, and only then, shall we have done our share toward the proper use of centrifugal extractors.

The Stafford Company, of Readville, Mass., sent to the trade a Christmas Greetings card with which they enclosed a calendar pad for 1922 to fit their Stafford automatic loom calendar which they distributed several years ago.

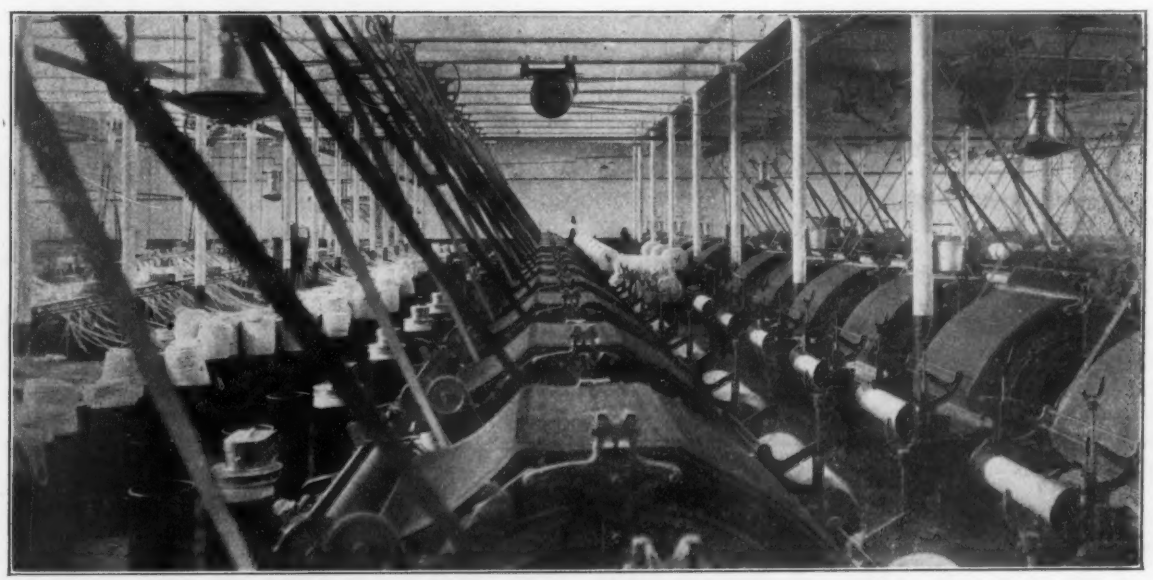
National Aniline & Chemical Co., New York City, were sending out complimentary calendars for the new year, arranged in a convenient manner for practical use.



PICKER ROOM IN THE PRINCE COTTON MILLS, LAURINBURG, N. C.

The Standard-Coosa-Thatcher Company has been formed as a consolidation of the Standard Processing Company and the Thatcher Spinning Company, Chattanooga, Tenn., and the Coosa Manufacturing Company, Piedmont, Ala. The capital stock of the new organization is $5,000,000. General offices will be in Chattanooga and sales offices in Philadelphia. This consolidation marks the culmination of a movement started several months ago to consolidate the three companies under one management. The three were formerly owned by the same interests. The Board of Directors of the consolidated concern are: John McFarland, Isaac Taylor, H. P. Rinehart, John H. Barlow, George Williams, W. P. Thatcher, R. J. Mathewson, P. F. O'Neill, A. G. Thatcher, G. H. Miller, T. R. Preston, John Stagmaier, R. P. Thatcher, R. C. Thatcher, and J. S. Verlenden.

The production of the two manufacturing plants of the company will be used entirely for mercerizing in the plant at Chattanooga, formerly known as the Standard Processing Company. By means of the recent merger, it is ex-



A VIEW OF THE CARDING DEPARTMENT AT THE PRINCE COTTON MILLS.

pected that there will be an opportunity to effect many economies in the management and direction of the policies of the three companies, while at the same time it will also add materially to the efficiency of their operation.

February 6th was the date set for the sale at public auction of the plant and property of the Fidelity Manufacturing Company, Charlotte, N. C., which was recently placed in the hands of a receiver. The mill has an equipment of 8,500 spindles and 80 looms and has been manufacturing damasks. The building is standard brick construction and the machinery includes a 250-hp. steam engine. William Anderson, of Charlotte, is the receiver.

It is reported that Ernest Dupree of Columbia, S. C., who owns an automobile plant at St. Matthews, S. C., is planning to convert it into a knitting mill.

The control and management of the Marlboro Cotton Mills, McColl, S. C., which have been in the hands of a creditors' committee for some time, were reinvested in the stockholders and directors of the mills on December 24, 1921, it having been announced by the committee that they had instructed the payment in full, principal and interest, on indebtedness of these mills on December 23, thus completing the powers and duties of that committee.

The Yazoo Yarn Mill, Yazoo City, Miss., has decided upon certain improvements and additions and will expend $100,000 in this connection. The main manufacturing building will be enlarged and several dozen operatives' dwellings will be built.

The Trenton Cotton Mills, Gastonia, N. C., are to immediately install 21 twisters in the present mill building. It is the plan of this company to spend about $200,000 in additions and improvements. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

It is reported that J. O. Bell, principal owner in the Green River Manufacturing Company, near Hendersonville, N. C., together with other business men, is planning to erect a half million dollar yarn mill in Hendersonville. It is understood that the proposed mill will be similar in design and product to the Green River Mill.

William Coleman has purchased a three-story building in Union, S. C., and will install machinery for the manufacture of textiles.

The injunction order issued by Judge J. B. Ray on November 28 restraining the Priscilla Spinning Company, Gastonia, N. C., and its officers from selling stock for unpaid calls was dismissed in January by Judge W. F. Harding. The Priscilla Mills and J. H. Mayes, president, filed separate answers denying the allegations of the complaint and declared that instead of having been wasteful and extravagant in erecting the mill plant, they had been able to save stockholders at least $100,000 in the cost of the plant. The mill also contended that it was not insolvent, or in danger of insolvency. The order of Judge Harding leaves the matter where it was before the restraining order was issued.

Business men of Corpus Christi, Texas, through various clubs and commercial organizations, are behind the movement for the erection of a cotton mill at that place to cost approximately $500,000. The plant is to be known as the Corpus Christi Cooperative Cotton Mills. Bankers and business men propose to finance the erection of the plant through the cooperation of the cotton farmers in that section. It is proposed to get the farmers of that section to pledge 1,000 bales of cotton or more each year for a period of five years to the mill to be paid for in stock issued to the owners of the cotton. This cotton would form the raw product on which the mill would operate, and the finished product would be sold to meet operating costs and to reimburse those who financed the construction of the plant. The plan is meeting with favor and already many farmers have contracted to cooperate to the extent of selling a portion of their annual cotton crop for five years, to be paid for in stock issued. Among the business men back of the project are W. R. Norton, Joseph Hirsch, Thomas Bell, Fred Roberts, and W. R. Weischer.

Pepperton Cotton Mills, Jackson, Ga., are to install 100 40-inch looms with dobby attachments.

At the Christmas banquet held on the night of the closing down of the mills of the Carolina Cotton & Woolen Mills Company at Spray, N. C., 247 members of the Carolina Cooperative Council were present, representing over 80 per cent of the membership of the Council. A banquet supper, consisting of roast chicken and all the appurtenances thereto, was served. The toastmaster of the occasion was L. W. Clark, chairman of the Council, who called upon representatives of the schools and churches for brief talks, following which a number of boxing bouts, the feature of the program, were staged. The preliminary contest was between two eight-year old boys who gave a two-round exhibition of sincere scrapping. The main bout was between W. J. Danaho, resident engineer, who tipped the scales at a little less than three hundred, and Harry Walker, whose weight barely passed the one hundred mark. In the third round, when the big man was pounding Walker to all corners of the ring, a friend of the little fellow climbed through the ropes and laid Danaho out with a padded club. Another feature of the evening's entertainment was an interesting program of polyphonic imitation, put on by Tom Corwine.

The Union Bleaching & Finishing Company, Greenville, S. C., has purchased $25,000 worth of ready-built houses for the mill village.

The Republic Cotton Mills, Great Falls, S. C., have placed a contract for a large number of ready-built homes for erection in the mill village.

The Washington Mills and the Mayo Mills, Winston-Salem, N. C., have been consolidated to do business under the name of Washington Mills, it is announced by A. H. Bahnson, treasurer.

An issue of 8 per cent cumulative preferred stock of $650,000 with par value of $100 per share in the Henrietta Mills, was sold recently by the Independence Trust Company of Charlotte. The purpose of this stock issue was to provide funds to pay, without interfering with the ordinary working capital, the last two installments against the purchase by the Henrietta Mills of the Cherokee Falls Manufacturing Co., Cherokee Falls, S. C. The Henrietta Mills operate plants at Henrietta, Caroleen and Cherokee Falls, and including the plant of the Cherokee Manufacturing Co., which became the property of the Henrietta Mills on the completion of this additional financing, the organization has a total equipment of 103,136 spindles and 2,269 looms.

The employees of the Brandon Mills and the Poinsett Mills, Greenville, S. C., have been insured by the mill managements. The insurance became effective December

12th, and the entire cost of the policies is borne by the mills, without expense of any kind to the individual workers who are insured. All employees in these two mills who had on December 12th completed less than one year and six months' service were insured for $500. Those who had completed between one year and six months' and three years' service received policies for $600; between three and four years, $700; while those who had been with the mill more than four years were insured for $800. Executives and department heads were insured for a fixed amount of $2,000. The insurance remains in force as long as the employee continues in the employ of the mill with which he is now connected, although he may continue it at his own expense should he leave the employ of the plant.

The Hannah Pickett Mills, Rockingham, N. C., are to add a new building to cost $50,000, floor space to be 35,000 square feet, and will install 10,000 spindles, 220 looms and accompanying machinery, costing approximately $500,000.

The Riverside and Dan River Mills, Danville, Va., will install 152 ninety-inch looms, with which they will replace a like number of narrow looms.

The Lincoln Mills of Alabama, Huntsville, Ala., have purchased a complete fire-fighting equipment for the protection of the mill properties and the residences in the mill village.

An increase of approximately one-third in floor space will be given at the plant of the Eastman (Ga.) Cotton Mills when the new construction now under way is completed.

The Eno Cotton Mills, Hillsboro, N. C., will build an addition to the cloth and shipping room, to be 192 by 103 feet, of mill construction, and costing $50,000.

The Acme Spinning Company, Belmont, N. C., is installing machinery in its new mill addition, and operations will begin when this work is completed.

Because of the growth of the mill village, and the resultant extension of water lines, it recently became necessary for the Tallassee Mills, at Tallassee, Ala., to build an addition to the water filtration plant. This addition, which was completed a few months ago, more than doubles the capacity of the filter, which supplies filtered water for use at the mills and the houses in the town.

An improved and convenient method of marking roving cans in the card room in order to avoid "mixed work" has been brought out by O'Malley & Carroll, Utica, N. Y. This is known as the "O-C" roving can indicator, and consists of a tape one inch wide in any color desired, with a patented tightening buckle which fits the circle of the can and holds the tape securely in place. This is an evident improvement over the old-fashioned methods of chalking, painting and tying strings onto cans. Every carding overseer naturally does his best to keep his work going correctly, and tries to impress the importance of this upon the operatives, and such methods as this indicator tend to assist him in preventing "mix-ups" in the cans of roving. The ease with which the human eye becomes accustomed to a regular arrangement of colors, and the facility with which these indicators may be applied to and removed from the cans make their use practical. They of course are interchangeable from one can to another, making any can readily available for any use.

The New England Mill Situation.

Competition for business among the New England mills has been growing very fast in the past few weeks. The desire of all the large manufacturing units is to keep their full forces employed so that costs may be kept down and they have been selling on very close profit margins. The strain of high taxation, high wages, high transportation costs and shorter working hours than those prevailing in other sections is telling.

During the week of January 16, the Wauregan, Manhansett and Quinnebaug mills in Connecticut announced a wage reduction to become effective this month, the amounts of the reduction not being stated. In some cases they will run to 20 per cent but in others a lesser sum will be deducted. It had previously been announced from manufacturers who convened at Boston that no wage change was pending. The delay in enacting a tariff bill was one of the causes for withholding action, and another cause was that the costs of living in New England in winter are very high, coal bills especially being very high this year.

Now that a start in revising wages has been made it is believed that it will be followed in other centers outside of New Bedford and Fall River and will include them last. Much will depend of course upon whether the organized workers accept the reductions passively. As the reductions are inevitable at some time because of the low costs in the South and the low purchasing power of those to whom cotton goods are sold, manufacturers feel that serious friction with the workers will be avoided. But the wage reductions will be only one problem settled. There are other matters of quite as serious import, notably the tax and freight questions and the matter of short hours. The 48-hour week was enforced in war time but it has never been accepted freely by mill owners.

The prices on dress ginghams, domets, and other fall goods were made recently. The Nashua mill continued its low prices on cotton blankets, while the Massachusetts mill continued the prices named by it last year and more in keeping with the cost of cotton today. Both concerns are selling their product. The fine fancy lines of cotton blankets made by the Esmond and Beacon mills have sold steadily and there is every reason to feel, the agents say, that production will be steady for some months. It is noted as of peculiar interest that fancy cotton blankets are now being sold all the year around in many retail stores.

These goods are popular for summer homes, camp blankets, and for many purposes where wool blankets are called too good and are looked upon as too costly. Some of the hotels, whose rooms are heated thoroughly, use these blankets the year around.

The new prices named on ginghams for fall are on the basis of 17 cents for Red Rose of Lancaster, and 22½ cents for 32-inch AFCs. The 1900 range Amoskeag cloth is priced at 16½ cents. Buyers have complained that these prices are too high but they are actually from 1½ to 4 cents a yard under some of the prices actually paid during the sharp cotton rise of last fall when needy buyers would pay whatever mills asked for any run overs.

On the flannellettes, prices were named on what competitors think was a low basis. It was several days after the Amoskeag Company named its prices that competitors

began to move. The demand for the dress ginghams was large enough to take all that will be made by the Amoskeag, Lancaster, Boston and Parkhill mills. The demand for the flannellettes was not so good. The jobbers stated that they carried over some goods and did not want to make engagements at this time on any higher level. They are of the opinion that prices will be lower before they will need goods. This view is not shared by manufacturers.

During the week when the large mills were making their fall prices on cotton goods, many external circumstances worked against the stability of the markets. Cotton fell off in price. A failure of a large export house was announced. It was stated that wage reductions would become general. These things naturally made buyers more bearish and timid than ever as they all came when the buyers were crowding the New York markets.

While manufacturers would be glad to profit from any decline in cotton there are many among them who are prepared to see cotton values go much higher before the new crop goes into the ground. For that reason they have been unwilling to take any chances in speculating about the price of the staple while making prices for the goods. If cotton does not advance, so much the better for them, while if it does, they are bound to suffer more before the end of the season.

The percale markets have softened in the finer end and price revisions are being made on the 72x76 and 80x80 cloths. No change is anticipated in the 4-4 64x60s and the 4-4 68x72s, printed. The finer count gray cloths weakened in price from 1 cent to 2 cents a yard while there was no corresponding decline in the low counts. This left the relative prices out of range and the buyers protested. They want to see prices fixed on a level that will permit the sale of these fine count goods over the retail counter at about 25 cents a yard. To do this the printers will have to make a basis of 17 cents for the 4-4 80x80s.

The corporation printers stole a march on the converters last year by featuring many snappy and stylish patterns on these fine count cloths and they did considerable business on them. Dress fabric buyers profited from the large business done in piece goods and they want to do so again this year. With gingham prices on a higher plane any lower price on fine count percales will give the gray goods mills a better chance for business and w help the printers to keep fully employed.

Gray cloth markets have softened somewhat since the opening of the year following the decline in cotton. At the same time the Indian Head suitings, a popular cloth based on a three yard sheeting, were sold as far ahead as mills would go and in all widths. There was also some inquiry for the finer grades of pillow tubings, showing that price alone was not the factor in the situation where jobbers could make sales because of a dearth of supply. In print cloths the lowest price touched by the middle of the month was 8½ cents for 38½ inch 64x60 and 5¾ cents for 27-inch goods. This level would not mean a loss to any well regulated southern plant but few Fall River mills could work out on those cloths on that level.

The Fall River manufacturers sold freely after the year opened and just before the close of the year. They unloaded many stocks of odd counts and widths for which the converting trades have regular uses. They also sold some light stocks of regulars for immediate shipment to finishing plants nearby. The prices received showed a moderate profit but the margin was not large enough to induce manufacturers to enter contracts. Most of the selling was done for short term delivery, rarely running beyond ten weeks.

In New Bedford, the fine goods mills have been taking on considerable specialty business in silk and cotton and fine madras shirtings and also several lines of dress fabrics and handkerchief linens, so called. These goods are made in sheer combed yarns in the gray and in colors, the latter being especially popular. Some mills entered fair sized orders on pongees, marquisetts, oxfords, etc., but very little heavy dress fabric work or plain combed yarn work came to hand. The fine cotton yarn business has also been rather slow and in the absence of activity in the automobile trade there are several New England mills that need work.

Many of the New England mills making ginghams, flannellettes, and other fall goods have been requested by jobbers to give fall dating again on all bills. The mills have been selling on a basis of 2-10-60 for some years, especially since war time credit conditions made it necessary to keep mill reserves liquid. The request of the jobbers was denied, not because it was not recognized that jobbers need assistance this year, but because general credits are uncertain, and the demands upon mills for cash payment for cotton and other raw materials are insistent. As a policy of selling, it is not denied that the mills prefer the shorter terms. Some of them would not object to giving the longer terms to a few selected houses. But they cannot have two policies as to terms and they finally decided to continue the short term. What that decision will produce in the matter of holding back or diverting business remains to be seen.

One of the very significant things that has come about in New England has been the acceptance by cotton mill machinery workers of several successive cuts in wages to enable machinery manufacturers to get their lines to a price basis that would be more attractive to mill builders. At the present time the mill machinery shops could all stand more work. They are finally on a basis that will permit them to make attractive prices for those buyers who care to invest this year or next and the belief obtains in some well posted circles here that if the wage reductions are accepted in the textile mills, if the tariff bill is soon enacted, and if there is no worse change in general business, many alterations and repairs and some additions of moment to large plants will be undertaken.

Mill stocks have recently been steadier and dividends are again getting back to pre-war regulars of 6 or 8 per cent annually. Deviation from those levels is not expected in many plants, long established, this year at least.

A full-color painting of a beautiful Indian maiden, Tacinca, forms the illustration of a very attractive calendar for 1922 distributed by Birch Brothers, Somerville, Mass., manufacturers of textile finishing machinery.

Curtis & Marble Machine Company, manufacturers of cloth finishing machinery, Worcester, Mass., distributed their usual calendar to friends and customers.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, January 14th, 1922.

Although there has occurred no appreciable change in the market during the past month, the continuance of a slack demand for spots being offset by light offerings, confidence is maintained in the probability of higher prices eventually.

Spinners takings thus far this season are running well ahead of last year, to December 13th 7,182,000 bales vs. 5,130,000, already 2,052,000 bales larger than last season when takings for the whole season were 10,390,000.

Ginnings to January 1st were lighter than generally expected—7,884,000 bales vs. 11,555,000 to corresponding date last year, or only 85,000 for the period, Dec. 13th to January 1st, against 678,000 last season, and many people are of the opinion that the government's estimate of 8,340,000 bales of 500 pounds gross weight will prove to have been too high.

Compared with last season, returns to the Census Bureau, as per report issued today, show that American mills during the first 5 months of the season consumed 2,749,000 bales against 2,179,000 for the corresponding period last season, of which 264,000 bales were linters vs. 208,000.

That consumption is likely to continue large in the United States is indicated by the large number of active spindles at the close of December—34,489,000 against only 29,914,000 last season.

At the present time the South has about 3,305,000 bales less to market than on even date one year ago, as the following deductions point to:

	This season	Last season.
Carried over in the interior, Aug. 1..	4,690,000	2,408,000
Crop, estimated	8,340,000	13,440,000
Total supply	13,030,000	15,848,000
Marketed to January 13th	7,344,000	6,857,000
Remaining to be marketed Jany 13.	5,686,000	8,991,000
World's visible supply January 13..	4,169,000	4,481,000
Total available, ex. mill stocks only	9,855,000	13,472,000

American mill stocks on December 31st were comparatively large—1,738,000 vs. 1,251,000 last season, but they are consuming much more of the raw product than last season, and it is likely that they are willing to stock up to some extent in view of the uncertainty of the size of the next crop, which, even if of moderate proportions, would likely be short of world requirements, as this season's consumption points to about 13,000,000 bales, and next season requirements may be larger, whereas this year's crop was only about 8,340,000 bales. In other words, the trade may be worse off for cotton next season than it is this season unless the yield this year is at least 13,000,000 bales.

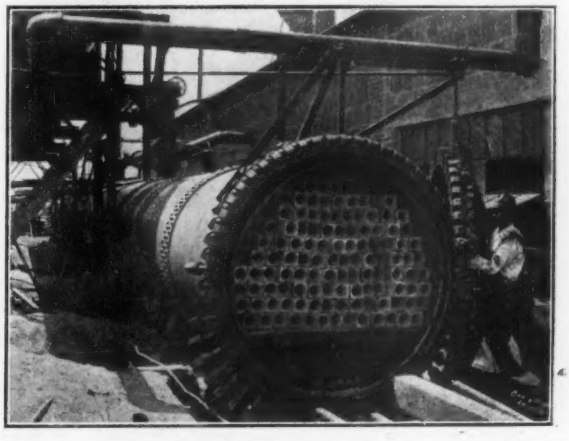
Meanwhile England is getting in better shape. The Irish troubles have been settled for all time, and advices are to the effect that the Indian boycott against British goods in India is on the wane, which makes Lancashire more optimistic concerning future trade prospects.

This year an actual famine in cotton was averted only by the large carry-over of more than 9,000,000 bales into this season. No such a surplus will be available at the close of this season, perhaps not by at least four or five million bales, making it imperative for the South to raise a large crop this year.

In the attempt to grow a larger crop this year, it is likely that there will be a moderate increase in the acreage, but what would that avail if the weevil should be only nearly as destructive as they were last year? So far this winter, temperatures have been very mild and the weather has been exceptionally dry, affording favorable hibernation of the weevil to survive the winter and appear in large numbers next spring and summer, as they did last year, the result of a mild winter. Aside from this feature of the situation, there is a big deficiency of rainfall in Texas this winter, soil being very dry.

Flooring That Outlives the Plant.

Until recently, mills specified a sub-flooring of untreated long leaf yellow pine, prime or merchantable grade, meaning long leaf yellow pine in which the heart content averages from 30 per cent to 75 per cent. This heart content may be expected to resist decaying elements for a considerable number of years, but the remaining portion of each piece is rotted away within a few years on account of the large sap content. Wear and tear of traffic, vibration of machinery, all tend to break down sub-flooring which has been weakened by decay with the consequence that



ONE OF THE PRESSURE TANKS AT THE SOUTHERN WOOD PRESERVING CO., ATLANTA.

the top flooring is apt to give away without warning and deteriorate more rapidly than if the sub-flooring was in good condition.

As in the case of railroad ties this condition was accepted for years as something inevitable. Lately, however, due to intense study of the situation by engineers a new method of sub-flooring has been successfully employed in various sections of the country—affording to mills an opportunity to floor their plants and then dispense with all sub-flooring problems and replacements.

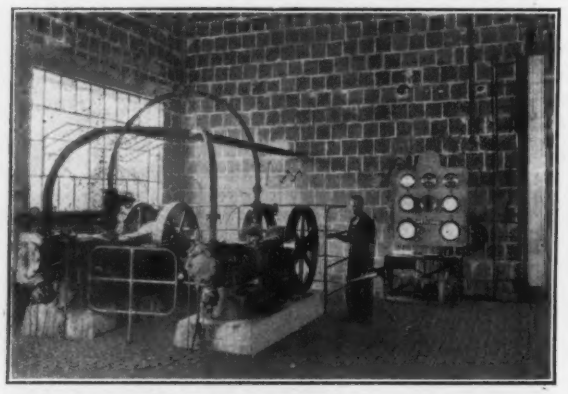
The remedy for the condition was found to be in preservation of the wood. The chief element of decay in wood is a minute fungus that grows in exceedingly fine thread-like filaments which spread throughout the wood. Certain substances in the wood form the food for this fungus and

as the fungi grow they absorb these substances thus breaking down the structure of the wood, until finally the wood reaches the stage we are prone to call rotten.

There are three other conditions necessary for the development of decay—moisture, air and a favorable temperature. As the elimination of any of these factors is practically impossible, the only efficient and sure method of preventing the development and growth of decay fungi lies in poisoning the food supply and it is on this idea that modern wood preservation has been developed.

The poisoning of the food supply is accomplished by the injection of creosote oil into the wood. This is accomplished by thorough saturation of the wood by creosote oil. Once this principle became generally known, plants of various industries installed expensive equipment to surface treat lumber for sub-flooring. The result hardly justified the expenditure as, although the flooring has a few years longer life than when laid with untreated lumber, still the cost of inefficient surface treatment rather offset the gain.

Surface treatment is undoubtedly better than no treatment, but the only sure and satisfying method that has been evolved—the method that so permanently preserves



THE PRESSURE AND VACUUM PUMPS AT THE PLANT OF THE SOUTHERN WOOD PRESERVING CO., ATLANTA. THE SAP IS DRAWN FROM THE LUMBER UNDER A VACUUM AND THE CREOSOTE OIL FORCED IN UNDER PRESSURE.

the wool that the flooring does not decay in a lifetime—is where the creosote oil is injected into the wood by hydraulic pressure after the wood has been prepared for treatment by the steam and vacuum method.

A recent trip through the extensive works of the Southern Wood Preserving Company was in itself an education in the modern methods of wood preservation.

Timber for sub-flooring purposes is milled from yellow pine in the mill, then placed on tram cars which conveys them to the treating chambers. A locomotive shunts the cars into a gigantic cylinder, the doors of which are then hermetically sealed. The timber in the cylinder is then subjected to a period of steaming, the duration of which depends upon the degree of seasoning of the wood.

Soon the rumble of engines drew our attention to the engine room and there the engineer explained to us that those machines were in fact pumping air from the sealed chamber. As the vacuum in the cylinder increased the air and moisture in the very fibers and tissues of the wood were drawn from the timber and sucked away by the pumps.

The proper vacuum having been obtained by which all sap and moisture in the wood was withdrawn, the timber was considered to be in proper condition to receive the preservative oil. The creosote was then admitted into the cylinder and after being filled, further oil was pumped into the timber by the pressure pumps, driving the oil into the pores and fibers of the wood.

Government statistics make the statement that pressure-vacuum process creosoted lumber for cotton mills will permit of an assurance of twenty to forty years of durability. As is the case of all such Government observations, the statement may well be considered decidedly conservative.

Other creosoted products have been in daily use for even longer periods and to the present date show no sign of deterioration. Authentic reports of creosoted conduit which had been buried beneath the ground for twenty-five years and when excavated were found in such perfect and sound condition that they were put back into the ground for another long period of service, are indicative of the extraordinary lifetime of creosoted lumber.

Now-a-days, wherever you go there are evidences of the rapid growth of this industry. Railroads, telephone and telegraph companies specify creosoted wood for cross arms, rail ties, fence posts, pipe conduit, etc.

Cotton mills that have installed "Creo-pine" sub-floors have been surprised to find that the first costs amounted to little more than for the best grade untreated lumber and that there were no further costs, either for repair or replacement.

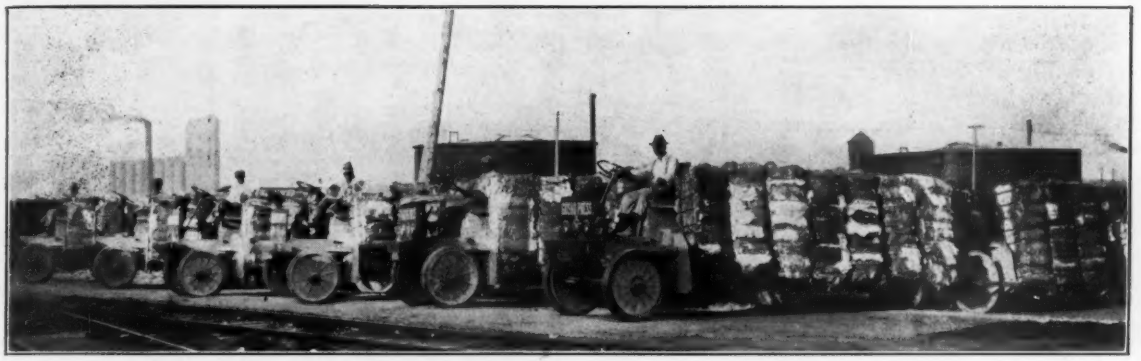
As with all radical improvements, cresoted lumber has been obliged to gradually work its way into public confidence and recognition. Its exceptional serviceability, however, has been so apparent that there is little doubt but that in the very near future manufacturers will insist upon sub-floors of creosoted lumber—floors that outlast the ordinary lifetime of machinery.

Electrifying Transportation.

The merits of the electric drive and its advantages from the standpoint of simplicity, economy of operation and dependability are given an excellent illustration in the application of this form of motive power to haulage equipment. For interdepartmental and other interior work, the electric industrial tractor, with its long winding chain of "trailers," has demonstrated its efficiency in a textile plant for transporting material in process, supplies and other materials from one department to another, and the electric truck for road use and other outside transportation purposes has a number of features that warrant the consideration of the mill manager who is confronted with the problem of transportation.

The electric truck manufactured by the Walker Vehicle Company, Chicago, Ill., is a prominent example of the development made in this type of trucking equipment. The accompanying illustrations show this truck in use in the textile industry, for which it has some obvious advantages.

The principle of electric trucks is simple, and in this feature is one of their chief recommendations. They are operated by current supplied by a storage battery to an electric motor, which forms the driving unit of the vehicle,

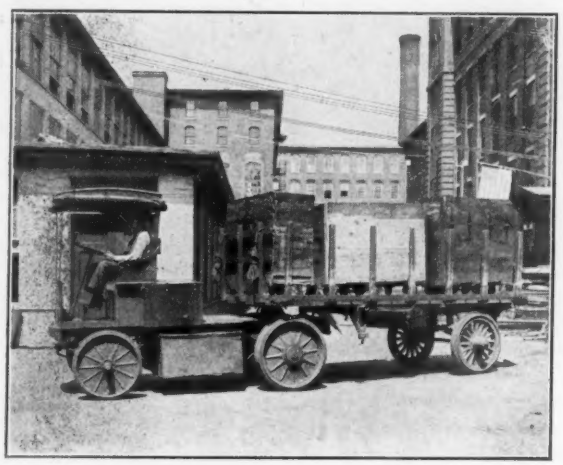


A FLEET OF WALKER TRUCKS AT THE GOSHO PRESS, GALVESTON, TEXAS.

thus requiring a very small number of operating parts for the truck and reducing the maintenance and repair cost to a considerable extent.

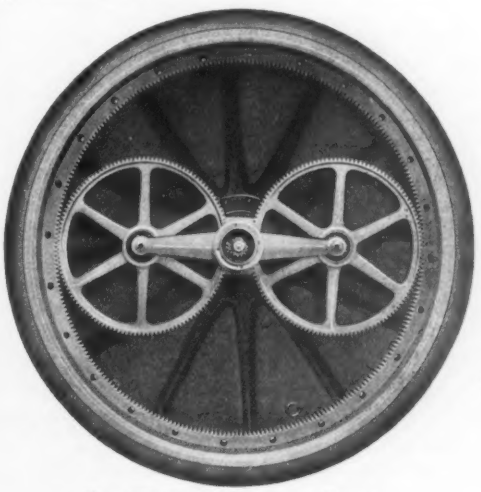
Another favorable feature of the electric truck is a low cost of operation and upkeep. A minimum number of parts, combined with the fact that the cost of the power required to operate it and the additional fact that the motor ceases to use power while the truck is not in motion, thus stopping for the time all expense of operation, makes it reasonable to assume that the annual cost of operating an electric truck would be comparatively nominal.

A feature of advantage in the Walker truck is the drive or "power plant." This is known as the Walker balanced drive, and was developed a number of years ago



A WALKER AT THE MASSACHUSETTS COTTON MILLS, LOWELL, MASSACHUSETTS.

after an effort to eliminate all useless waste of power and wear of parts. This drive is very simple in construction, containing in all only ten parts, all of which are rotating and balanced. The entire unit is located in the torpedo-shaped rear axle of the truck, which contains the electric motor, the differential and the two drive shafts which extend from the differential sockets to the centers of the rear wheels—with pinions on the wheel end of each shaft. These pinions rotate the balanced gears in both rear wheels, transmitting the power directly to gears in the tire rims, by means of idler gears mounted on the stub axle yoke arms in each rear wheel. The design of the mechanism in these rear wheels is plainly shown in the accompanying illustration of the interior of a Walker rear wheel with the outside disc removed. In the center is seen the pinion on the end of the drive shaft, which transmits the power from the motor to the idler gears, from which it is carried on to the rims of the driving wheels, giving a positive, steady, efficient drive.



THE WALKER BALANCED DRIVE.

The small number of parts in this drive make it unusually simple, its location gives it the advantageous feature of accessibility, and a greater tractive power is secured through an accurate and permanent self alignment and balance of its working parts.

Another feature which this arrangement of the drive affords is an adaptability of the chassis. Every truck user has requirements to which the chassis should be properly proportioned in order to secure the correct load distribution, and with all the operating parts of the drive located in the rear axle, it is only necessary to lengthen or shorten electric wire cables in order to secure the length of chassis necessary for any particular type of work.

It should be understood, however, that electric trucks are not intended for use where excessive mileage and speeds are required. The Walker truck, for example, has a cruising radius of from 40 to 50 miles on a single charge of a battery, and it is within these limits that the manufacturers especially recommend the use of electric trucks. Furthermore, the maximum obtainable speed is around twelve to fifteen miles an hour. However, for short distances, and in service which requires frequent stoppage,

the builders assert the advantages of the electric in economy, long life and dependability.

Due to the fact that a number of southern cotton mills generate their own electric power or secure it at a very low rate, it would seem that the cost of re-charging the batteries for use in electric trucks would be nominal.

The Walker electric truck is handled by the J. D. Collins Sales & Engineering Co., Grant Building, Atlanta, Ga., who are the southeastern representatives of the Walker Vehicle Company.

A New Mill Supply Organization.

Vivian M. Manning, who for the past several years has been a member of the mill stocks and bonds brokerage firm of Mills & Manning, Greenville, S. C., on January 1st retired from this firm to become the manager of a new mill supply department of Norris Brothers, manufacturers of shuttles and other mill supplies, with offices and plant at Greenville. Mr. Manning also became a director of the firm.

In connection with this announcement concerning Mr. Manning, comes the statement of Norris Brothers that they have increased the capital stock of their organization from $200,000 to $600,000, and plan an expansion of their manufacturing plant at Greenville and extensive improvements in their foreign supply department. Already one of the foremost manufacturers of shuttles and shuttle blocks in the country, this firm contemplates further additions to their line of textile supplies and equipment and their enlarged mill supply department will be developed under the direction of Mr. Manning. It is understood that among other lines they will engage in the manufacture of spools. When the proposed additions and enlargements are completed, it is stated, they hope to be in a position to completely supply textile mills of this section from their Greenville plant.

Mr. Manning is one of the best known men in southern textile circles, and his new connection will be noted with interest by his many friends in the trade. His first connection with the industry dates back to 1909 when he became connected with the old Monaghan Mills at Greenville as supply clerk. This position gave him an opportunity to study the supplies going into the mill, and he spent a large part of his time going through the mill making tests with various supplies and keeping records thereon. He was then made assistant purchasing agent for about two years, after which he became purchasing agent for the seven mills then under the direction of Lewis W. Parker. When the Parker Cotton Mills Company was formed he was made purchasing agent for the sixteen cotton mills and one cotton oil mill comprising that company, and a later addition of mills to his list made a total of twenty-three cotton mills and one cotton oil mill for which he was the purchasing agent.

Later, Mr. Manning entered the bond and brokerage business, and a few years ago, in association with Henry T. Mills, organized the firm of Mills & Manning, which, during the several years it has been in operation, has established an excellent reputation in its line of business. Thomas L. Lewis, formerly manager of the stocks and bonds department of Parrish, Gower & Springs, has become associated with Mr. Mills, the former partner of Mr. Manning, in the firm of Mills & Lewis, which will succeed the firm of Mills & Manning.

A Complete Welding Service.

The Bird-Potts Company, Inc., composed of George Bird and Bruce Potts, welding engineers, operate one of the largest and most complete shops in the country devoted exclusively to the welding of metal materials. They are located in their own building, at 376-378 Marietta Street, Atlanta, Ga., and are excellently equipped to do kinds of welding for all kinds of work.

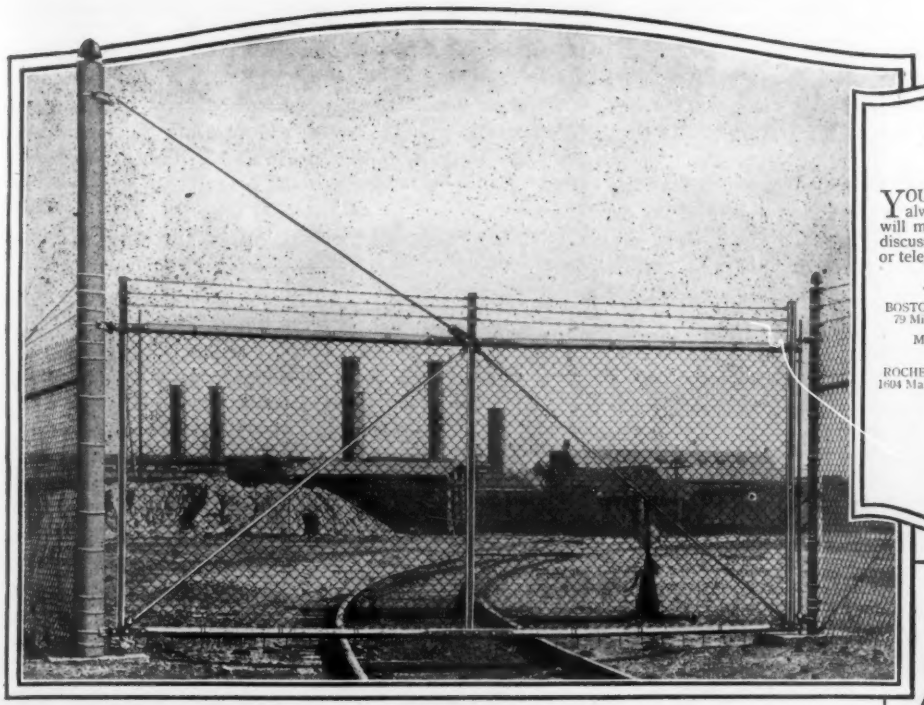
George Bird, the senior member of the organization, is a pioneer in the welding business in the South, and is well known in the southern textile industry, having been engaged in doing commercial welding for cotton mills

NEW PLANT OF THE BIRD-POTTS COMPANY, INC.

throughout the South for eleven years. His ability in executing particularly difficult welding jobs is familiar to the many mills where this work was performed. He has been connected with the welding industry practically since its development as a separate industry, and is considered to be one of the best practical welding engineers in the country.

Mr. Bird started the first welding machine in the South, an oxy-acetylene machine, soon after that process was made practicable, and a number of years ago organized the Bird-Wilcox Company for commercial welding and the sale of oxyacetylene welding equipment, withdrawing from this concern early in 1919. He is a charter member of the American Welding Society, and during the war served on the Welding Committee of the Emergency Fleet Corporation in an advisory capacity. This committee, through the development of welding by the electric arc, rendered a distinct service to the government in repairing confiscated German ships which the Germans had endeavored to render useless before they were turned over to the United States. Through the use of the welding process, the damaged engines were quickly repaired and the ships made available for use in transporting troops to France when they were needed.

In January, 1920, in association with Bruce Potts, Mr. Bird started the Bird-Potts Company, and subsequently "The Welding Building," as this plant is known, was constructed in Atlanta. Mr. Potts is also well known in the



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YOUR special requirements are always considered. An expert will meet you at the property, and discuss plans and prices. Write, wire, or telephone any address below.

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CLEVELAND, OHIO Guardian Building
MINEOLA, LONG ISLAND, N. Y. Jericho Turnpike
ROCHESTER, N. Y. 1604 Main Street, East
HARTFORD, CONN. 902 Main Street
PHILADELPHIA, PA. Real Estate Trust Building
CHICAGO, ILL. 8 South Dearborn Street
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FIRST: because an *ANCHOR POST* Fence can be erected anywhere. In swamps, stony ground, clay, sand, loam, bed rock or cinder fill; loose or hard, wet or dry—Anchor Post Fence Engineers find a way to set the posts **permanently.**

SECOND: because there is no terrain an *ANCHOR POST* fence cannot follow. Up hill and down; spanning or dipping into gulleys, skirting embankments, topping hillocks; following the curve of land, without break or make-shift—yet always impregnable.

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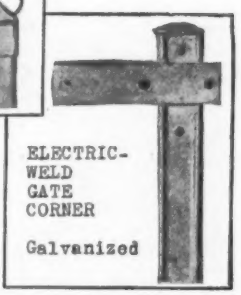
That is what our "Sales and Erecting Service" means to you; the most **economical** fence and gate for your requirements. And it is this service which your post card will bring.



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Anchor Post Fences

PERMANENT—BECAUSE THEY ARE GALVANIZED

welding business, having associated himself with Mr. Bird in this work as a practical welder soon after the introduction of oxy-acetylene in the South. During the war he served in France with the aviation corps and practiced the use of welding in connection with the repairing of flying machines.

The purpose of the Bird-Potts Company is the further development of welding. They are well equipped to do both electrical and oxy-acetylene welding on any size job and being equipped with both types of apparatus, are in position to select the type best fitted for use on any particular job. Along this line also, they render service to plants who have welding apparatus of their own, by going to the plant in question to care for any welding job that is too large for its own men to handle. Also, they are selling agents for the electric welding apparatus and supplies manufactured by the General Electric Company, being the only agents in the world for the G-E Company on this type of apparatus. They are also equipped with portable welding outfits for performing outside work.

Furthermore, it is announced that after May 10, 1922, the Bird-Potts Company will extend their service to the sale of oxy-acetylene welding equipment and supplies. While at present they use this process in work in their own shop, on jobs for which it is applicable, after the date mentioned it is planned to enter the selling field of this end of the business.

The building which the company erected for their business is two-story and basement, of brick construction. It has a frontage of fifty feet, and extends back 107 feet to the railroad tracks of the Western & Atlantic Railroad. This latter feature has proven to be of considerable advantage in the unloading and loading of heavy machinery and parts shipped to them to be welded. For this purpose, they have installed traveling cranes with 10-ton carrying capacity, enabling them to handle with facility the heaviest articles, transporting them from the railroad cars into the shop, and on to the cars again when the work of welding is completed.

The equipment of the plant consists of four electric welding machines and four oxy-acetylene welding machines. It is also announced that at an early date they will install a new model automatic electric welding machine. The advantage of this is that in welding on lengthy jobs, it is unnecessary to stop the operation when a welding rod, as used on the ordinary type of machine, becomes exhausted. The new model takes the rod from a coil of great length, thus enabling the welder to complete the job without interruption.

In addition to the special and heavy commercial welding already mentioned, the Bird-Potts Company also engage in repairing, rebuilding and recoring automobile radiators, and maintain a department for the repairing and rebuilding of automobile bodies and fenders.

A book entitled "The Shipping Board and Our Merchant Marine" is being distributed by The Mechanics & Metals National Bank of the City of New York. The booklet presents an analysis of the situation now existing in the United States, wherein the Shipping Board constitutes an important factor in the economic situation of the country.

Because of the power of its huge fleet and the influence of its policies and decisions upon the development of the entire American merchant marine, the activities of the Shipping Board are of wide current interest. The book analyzes in detail the shipping legislation of the country prior to the war and since, and presents the immediate problems of the Shipping Board and indicates their solutions.

A System of Mill Accounts Outlined.

BY J. A. H.

The purpose of accounts is to record financial history. Aside from the statistical value, perhaps the largest measure of usefulness of accounts lies in their freshness. Manifestly it is more interesting to read from the bank account what today's balance is, than what it was two months ago. Correct accounting principles rest upon method. Method is the shortest way to a desired result. System combines methods into a general scheme. Therefore we have this prescription for effectiveness.

Today's transactions recorded today....	30%
Method	40%
System	30%
Effectiveness	100%

The best accounting system is that which presents accurate information, which discloses complete information and that most frequently and soonest after the actual transactions. Thus an annual financial statement completed ninety days after the balance sheet date is more or less interesting, but viewed rather as a semi-modern relic.

A system of accounts used by many manufacturers is based upon the pay roll term, using two fortnightly periods as a monthly unit. This plan meets the generally recognized thirty days, or monthly period, as the setting or casting up date. Ledger balances are drawn off and liquidations made with creditors and debtors. As a preliminary to framing the proper financial statements, a trial balance of the separate accounts is extracted from the ledger so as to determine the mechanical accuracy of the clerical work. Inventories have been prepared of all the unused purchases of materials and supplies and of the unsold product, both unfinished and finished; the bookkeeper sets them up in their proper places and proceeds to compile their financial statements.

In order that these statements may be easily and promptly gotten up, the records should be maintained in such a manner that this compiling may, as nearly as possible, be merely a work of transcribing. It has been found by experience that it is better to carry the record of business transactions in such a style that the detail necessary for the monthly statement falls into related groups. Then these groups separate themselves into the various unit members of the family of accounts, but with an arrangement susceptible of ready assembling.

Accounts naturally fall into four grand divisions. These are asset, liability, expense and earnings. Fine distinctions are drawn and other names are sometimes used such as resources in place of assets and revenue for earnings; but the meaning is practically the same, the nomenclature being determined by the nature of the business.

The expense accounts resolve themselves into those

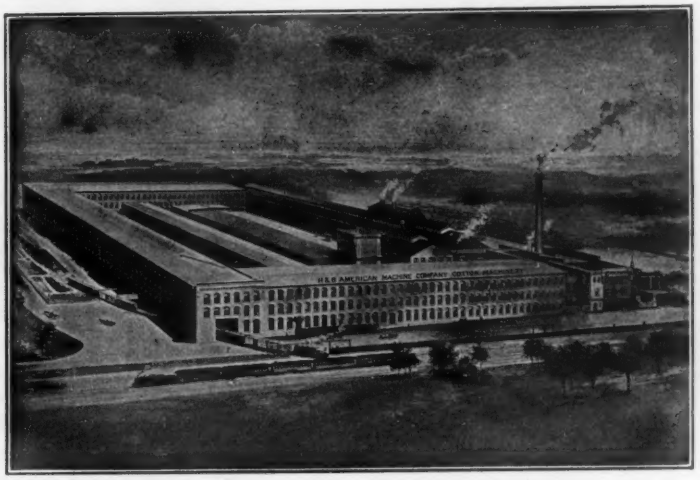
H & B AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

Southern Office Atlanta Trust Co. Bldg. Atlanta, Ga.

Opening and Picking Machinery

Card Room Machinery



Spinning Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

COTTON MACHINERY

charges which enter into manufacturing cost, selling expenses and general expenses. Others may crop up, but these are the usual groups, aside from the raw material charges, which, in a way, come under the manufacturing costs, as do the supplies.

Much ingenuity has been exercised in the form and style of books designed to hold the current records, but perhaps the best method is known as the columnar system. A good exponent of this system is seen in the evolution of a record-book known as the cash journal. This, as its name implies, is a book taking the place of the old fashioned cash book and journal, arranged with a sufficient number of distributive columns to the needs of the business for which it is designed. The plan is to save time in carrying the monthly totals to the ledger in place of many detail postings. Thus the record of bales, pounds or tons is carried to the ledger in one writing at the end of the month.

The separation of operating accounts into the various groups makes for more intelligent understanding of what the factory is doing. One of the elements of good management is the keeping down of expenses. Unless the expenditure reduces the cost of manufacture or the general expense cost, managers are chary of allowing any more expense to be charged against the business than is absolutely necessary. There are scores of details which have to be considered in finding mill costs, and some mill managers do not prove their manufacturing and other costs and their sales of products with their statement of assets and liabilities until the end of the calendar or fiscal year.

It has been claimed that there is no urgent necessity to do this more than once a year; but if this were wholly true one might carry the thought further and say, "If we waited this long why trouble about it at all?" The preparation of trustworthy statements and reports takes considerable time and skill coupled with experience. To get out these statements means that competent persons will have to be engaged several days in each month on such work, which, of course, means additional expense. To obviate this, however, the books and accounts can be laid out in such a systematic manner that after trying-out, and under intelligent supervision, the necessary information from the various departments will almost flow into their respective stations.

The purpose of accounts is to furnish history which will be immediately available to forecast and make provision for periodical financial needs. By periodical, we mean weekly or monthly. Financial settlements are made by the month, when not by the week or for cash. Naturally then, financial statements should review operations by the month, when not oftener. From this it may be seen that while it would be interesting to go into great detail in making up cost statements and compare periodically the cost and production of each machine or operation, yet it is not always commercially practicable to bring it down to such a fine point. It has been found well to work out these costs on general lines. Thus, determine the quantity of material taken into the mill each day, which is entered on the consumption report. Then, a certain amount of materials are produced each day, which is entered with full description on the production report. So much fuel, oil, repair parts and general supplies have been used today. These are all en-

(*Continued on page* 287.)

Notes About Men You Know.

EDWARD A. STUHRMAN has announced the opening of a business of general structural engineering and contracting, with offices in the Candler Annex, Atlanta, Ga., where he is now equipped with an able corps of assistants.

Mr. Stuhrman's association with architectural and engineering work dates back over a period of more than 20 years. In 1903, after three years' experience as architectural draftsman for large architectural firms in New York City, he matriculated in the Columbia University School of Applied Science, from which he graduated in 1907 with the degree of Civil Engineer. After this he was for two years designing engineer for the Turner Construction Company, New York City, reinforced concrete engineers and constructors. For the next four years he held the positions of office engineer and office manager and engineer with the Chicago, Milwaukee & St. Paul Railway, bridge and building department, and the Industrial Engineering Co., New York. In the latter position he specialized in design and construction of industrial plants. In 1912 he became chief designer and engineer for Arthur Tufts, specializing in all types of reinforced concrete factory construction. In 1919 he became vice-president and general manager of Arthur Tufts Company, Atlanta, general engineering and building construction.

With this extensive and varied experience behind him, Mr. Stuhrman, who is 37 years of age, has now established a business of engineering and contracting, and will devote a large proportion of his efforts to work of this character in the textile field, including general structural engineering and contracting, reports, lay-outs, general engineering and architectural practice relating to industrial plant work. He is a member of the American Society of Civil Engineers and the American Concrete Institute, a licensed architect in the states of California, Illinois and Louisiana, and a licensed structural engineer in the state of Illinois.

R. W. SMITH has resigned as overseer of spinning and twisting at the Dilling Mill, Kings Mountain, N. C.

W. T. CRESWELL has returned as overseer of carding at Mill No. 3, Chadwick-Hoskins Co., Charlotte, N. C.

W. R. THIGPEN, formerly overseer of finishing at the Samoset Mills, Talladega, Ala., has accepted the position of overseer of finishing at the New Stonecutter Mills, manufacturers of fine dress ginghams, Spindale, N. C.

E. S. DUNN has been promoted from assistant general superintendent to general superintendent of the Avondale Mills, Birmingham, Ala.,

S. L. MCCRACKEN recently resigned as assistant superintendent of the Greenwood (S. C.) Cotton Mills to become superintendent of Steele's Mills, Rockingham, N. C.

G. F. ROBERTS has resigned as general superintendent of the Avondale Mills, Birmingham, Ala.

V. E. Myers has resigned as overseer of the cloth room at the Arkwright Mills, Spartanburg, S. C., and accepted a similar position at the Tucapau (S. C.) Mill.

J. L. COOPER has accepted the position of overseer of carding at the Alice Mills, Easley, S. C. He recently resigned a similar position at the Easley Cotton Mill No. 1.

W. B. WACHTLER, until recently manager of the Chicago district of the Industrial Bearings Division, Hyatt Roller Bearing Company, has been promoted and transferred to the New York headquarters of the division as engineer in charge of general applications.

J. E. SHAW has accepted the position of carding overseer at the Easley (S. C.) Cotton Mill No. 1, succeeding J. L. Cooper.

JAMES WARD has resigned as superintendent of the Daniel Morgan Mills, Cowpens, S. C.

H. G. Leigh, superintendent of the Fidelity Manufacturing Company and the Piedmont Commission Company, Charlotte, N. C., will also act in a similar capacity for the Daniel Morgan Mills, Cowpens, S. C., succeeding James Ward.

R. E. PETERMAN has accepted the position of overseer of weaving at the Daniel Morgan Mills, Cowpens, S. C.

ERNEST METZGER has been made superintendent of the Banning (Ga.) Cotton Mills.

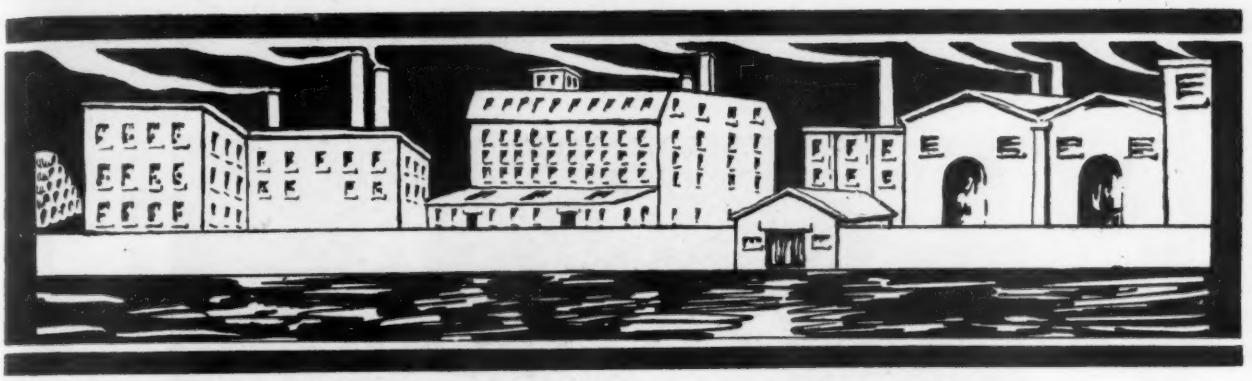
B. T. SMITH has resigned as overseer of spinning at the Newnan (Ga.) Cotton Mills.

D. L. GARRISON has resigned as overseer of carding at the Saxony Spinning Company, Lincolnton, N. C., and accepted a position of a similar character with the new Medora Mill, at Mount Holly, N. C.

F. G. ASBELL has been made overseer of carding at the No. 2 Mill, Roanoke Mills Co., Roanoke Rapids, N. C., succeeding J. M. Creekmore, resigned.

ROBERT DUFF SLOAN, secretary of the Piedmont Manufacturing Co., Piedmont, S. C., since 1884, and well known in the cotton manufacturing business in South Carolina, died at a hospital in Greenville, S. C., on January 4th.

The Cotton Dealers' Association of Atlanta visited the plant of The A. French Textile School at the Georgia School of Technology on Wednesday, January 18, and gave the equipment a thorough inspection. They expressed themselves as greatly pleased with the improvements that have been made recently.



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Warren Soap ***Warren Service***

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Established 1870

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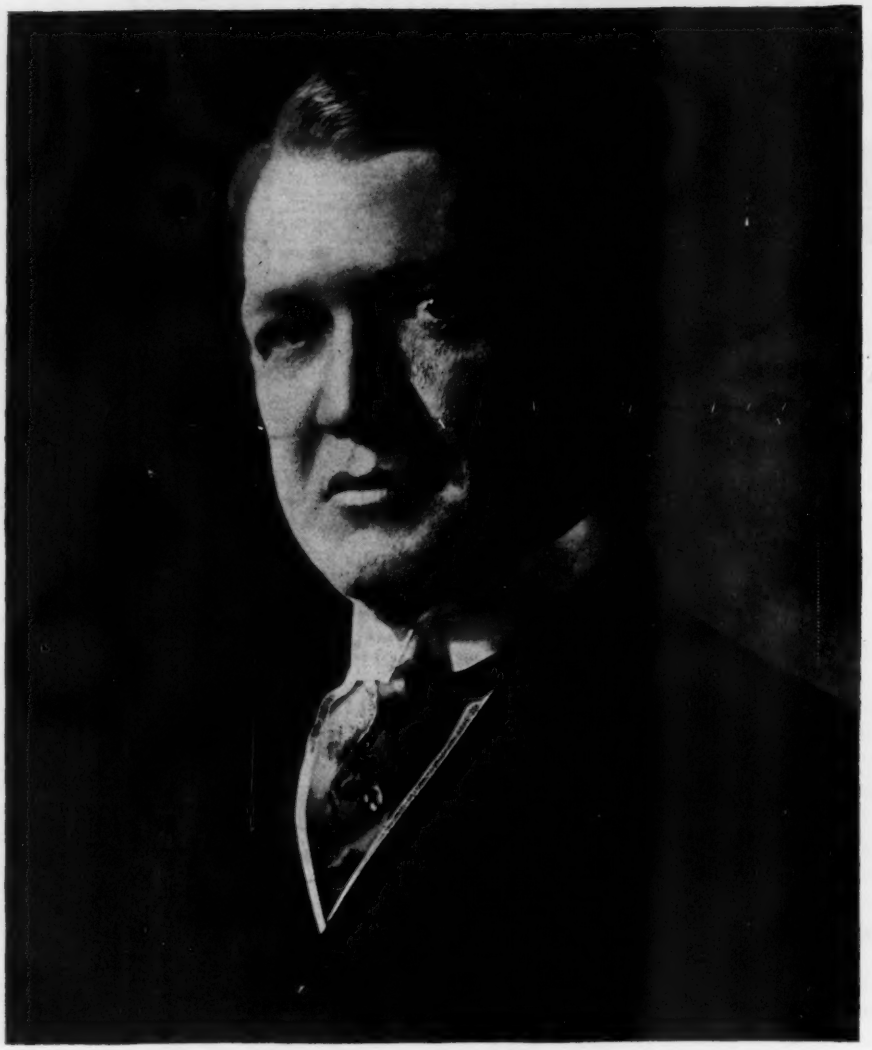
Incorporated 1890



JOHN G. LONSDALE

PRESIDENT, NATIONAL BANK OF COMMERCE, ST. LOUIS
PRESIDENT, NATIONAL BANK SECTION OF THE AMERICAN BANKERS ASSOCIATION

The complete audit of the commercial borrower's statement by dependable certified public accountants is a form of business insurance that should be encouraged in all lines of industrial and mercantile activity. There has been a marked tendency during the past few years on the part of business men to recognize the value of the complete audit, because they realize that an examination of their records by disinterested and capable certified public accountants eliminates guess work and serves to establish the essential facts of business as they really are. I commend the complete certified public audit as an instrument of great and growing value in the development of American business and the safeguarding of credit.

Jno G Lonsdale

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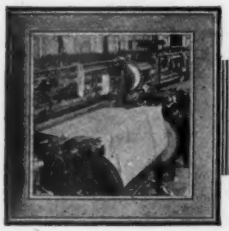
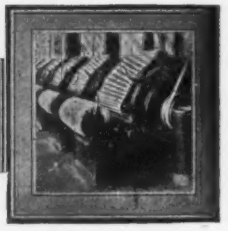


How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects



We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Piece Work in Carding and Drawing.

EDITOR COTTON:

Some few months ago my overseer of carding asked me to allow him to increase the weight of our picker laps so that he might increase the weight of the card sliver and so on up to the slubbers. This was in order to put a greater production in poundage through to the fly frames, as he felt it was going to push the cards to keep up with the balance of the mill. I hesitated at the moment and insisted that the machines be pushed to the limit as I am not in favor of a heavy picker lap. Our finisher picker lap is 10.50 ounces per yard and the card sliver is 44 grains. I give this to show what our process is.

After running quite a while the overseer still insisted that it would be almost impossible to keep his department up with the present weight of picker laps and card sliver. At the same time I was giving this matter a very careful study and was wondering how we might increase production without increasing the weight of the picker lap and card sliver. I finally concluded to try out piece work on the drawing. I made several inquiries but found that no mills in our territory were paying drawing tenders by the piece. I then decided to try out the piece work on drawing. We purchased hank clocks and attached them to the calender rolls on the finished drawing, which of course is the last process the sliver passes through as sliver.

I operated the drawing frames about six weeks with the hank clocks. I had the overseer read the hank clocks each day and give me a report as to the production in hanks, and of course the running was based on 55 hours. At the end of six weeks I averaged the hanks per day and per week and at the same time figured speeds and diameter of calender roll against actual production made during the six weeks, and then set a base figure as a price per hank for the finished drawing tenders.

We have been paying by the piece for running the finisher and breaker drawing now for quite a while, as at the time we put the finisher drawing on the hank system, we also began paying the breaker drawing by the hank and also the card tender by the hank. My reason for paying the breaker and card tender by the hank was that the card tender and the breaker tender would realize the importance of giving good work to the finished drawing in order to keep the finished drawing going as much as possible.

We found by trying this out that the production increased ten per cent without increasing the weight of the picker lap or card sliver. Also that the card tender and the drawing tenders are making more money than they did before the piece work was put on.

A great deal of waste has also been eliminated as the card tender will save every yard of sliver possible for the breaker drawing tender and the breaker tender will do likewise for the finished drawing tender. We have also noticed in addition to this that the card tenders make sure of all piece work done on the cards, that is they make a good lap when it comes to piecing up the sliver so that there will be more net pounds of sliver made for the breaker drawing, and in turn the breaker drawing tenders do the same for the finisher drawing tenders.

As will be seen, therefore, our experience with the piece work method on cards and drawing has been very satisfactory, and if any other readers are practicing this system on these machines, I should like very much to read of their experiences. H. A. T. (S. C.)

A Daily Sizing Report.

EDITOR COTTON:

In response to your request for a description of our "Size Cooker's Report Blank," which we use for keeping a record of size making in addition to the regular form used in weighing beams and calculating the percentage of size in each set, I am pleased to send a copy of this blank herewith. On this form, which is self-explanatory, we have: Inches of Water in Kettle, Pounds Starch and Pounds Compound Used, Time Started Cooking, Time Stopped Cooking, Time Size Turned On, and the other features shown.

We require the size maker to fill out one of these blanks for each kettle of size cooked, and insist that he keep it accurately. I find that it is of considerable help to him, particularly in telling him just how long he cooks each kettle. Without some such record he frequently forgets just when he started cooking, and consequently cooks a kettle either too long or else not long enough. It also helps in the matter of keeping correct proportions of ingredients, because the size man has to put it down in black and white, and he never knows just when we are coming along to check up on him.

I have been getting more even weights in our cloth since introducing the use of this form in our slasher room. Before we started this practice, we sometimes would get six per cent of size on one set and likely 14 per cent on the next, which would mean a variation of about five per cent on the cloth weight. With this form, however, it has not

been necessary to lighten or "heavy" yarns in the spinning room for the past three months. Of course the carder has to be careful to hold his weights to take care of variations in stock, etc., but before, no matter how well the carder held his numbers the cloth would vary considerably anyway, and oftentimes so suddenly and radically that it was necessary to change the weight of the filling. It is my opinion that most of those changes were due to variation in the amount of size put on the warps.

Even yet we have considerable variation in the percentage of size going on the yarn, as shown by our daily slasher report, but it appears that the most of this variation is due to the difference in drying the warps, as when the cloth gets to the cloth room there is very little variation.

There is absolutely no doubt but that anything that will help the size maker to get the same amount of ingredients into every kettle every time, and to cook every

DAILY SIZING REPORT

Date _____

Pounds Starch _____

Pounds Compound _____

Inches of Water Started _____

Inches of Water Finished _____

Time Started Cooking _____

Time Compound Added _____

Time Stopped Cooking _____

Time Started Using _____

_____

Signed _____

kettle the same length of time, will materially help in holding cloth weights. For the conscientious worker, who really wants to follow instructions, the form illustrated herewith is of great assistance, and it also makes it easier to check up on the careless size man. I am passing this along to your readers, for what it may be worth to any who are troubled with uneven cloth weights. Perhaps it will offer a solution in their case as it did in mine. At any rate, if it is of any help to any readers, I will be glad of the opportunity that has been offered me to be of service. C. S. T. (Texas.)

Lockwood, Greene & Company, Engineers, Boston and Atlanta, distributed an attractive calendar for 1922, showing photographs of twelve outstanding examples of their engineering work accomplished during the past year. A number of textile establishments are included in this list, among which are the new dyehouse at the Riverside and Dan River Cotton Mills, Danville, Va.; the weave shed at the Columbus (Ga.) Manufacturing Co.; a building for the P. H. Hanes Knitting Company, Winston-Salem, N. C.; and a building for the Great Falls Manufacturing Co., at Somersworth, N. H.

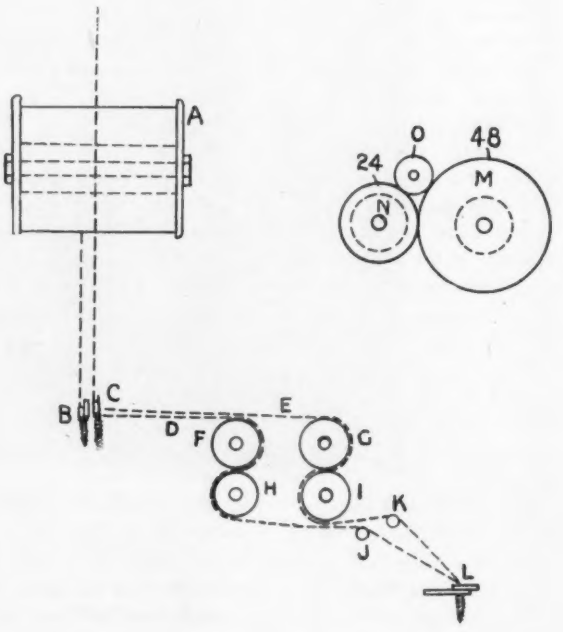
Ratine and Ratine Yarn Making.

EDITOR COTTON:

Replying to the query of "E. L. L. (Ga.)," I wish to say first that the question he asks, in regard to full details for the manufacture of ratine yarn, 6s and 20s, might have been more fully answered if he had given more particulars in regard to the construction of the cloth to be made, as this governs, to a very great extent, the number of turns per inch to be inserted in the yarn, in order that its appearance may be satisfactory.

There are various types of ratine cloth, some made by the nature of the weave, while others are made by the type of filling which is used. The one which "E. L. L." wishes to make is undoubtedly made by the filling, which is of the type known as ratine filling yarn, there being of this, as has been already intimated, a variety of types, all depending upon the particular construction of cloth to be made, as well as on the effect desired.

There are two general methods in use in the making of ratine yarn, one being the twisting or spiraling of a fine strand of yarn around a coarse strand, while the other is the exact opposite, or the twisting of the coarse yarn around the fine. Each of these methods has its list of sup-



porters, and both produce good results, but personally I am in favor of the latter method, for no other reason than that I like the appearance of the cloth when finished far better when the yarn is made in this manner.

It may seem strange to a person who has never worked on novelty yarns to say that one strand of yarn is twisted or spiraled around the other one, instead of saying they are twisted together, but after a little thought it will be seen that in order to produce novelty yarns a novel means must be used. If the ordinary method was used it would simply produce ordinary ply yarn, but instead of this we feed one strand of yarn more rapidly through the rolls than the other one, thus turning out at the front of the delivery rolls

TEXTILE BANKING COMPANY

FACTORS

FIFTY UNION SQUARE

NEW YORK

a greater length of one strand of yarn than of the other. This yarn which is producing a greater length than the other one disposes of its excess amount by what is known as a spiraling movement. A clearer understanding of this may be had by watching a spool run out on the twisting operation. It will be noticed that the yarn, for a few inches at the end, is twisted loosely around the other strand of yarn; this is because the end is no longer held back by the weight of the spool, and therefore for the time being more length is being produced at the front roll and thus a spiraling action takes place. Right here is the nucleus of the whole thing, and what in the twisting of ordinary ply yarns would be termed bad or spiral yarn, would in the making of ratine or novelty yarn produce excellent results.

The inquirer states that he has Lowell and Whitin twisters mostly, with a few Draper, Fales & Jenks and Collins. Of these makes, I know that the Saco-Lowell Shops and the Draper Corporation furnish twisters equipped with double lines of top and bottom, but from the tone of "E. L. L.'s" inquiry I take it that his twisters are not of this type. I am sending herewith a sketch of an arrangement which I am sure will help him considerably and will not cost very much nor be much trouble to rig up. Looking at this sketch, it will be very plainly seen how the yarn is threaded up on the twister, when making novelty or ratine yarns. This is one of a number of arrangements which will accomplish this work, the one shown herewith being one which we contrived at one of the mills where I worked for making ratine yarn. This is so arranged that it may be geared to produce any desired effect in the yarn, thus accomplishing the object for which it is intended.

Referring to the sketch, A is the spool upon which, in this case, the 6s yarn would be placed, B is the thread from spool A which follows the line D around the top roll F, then around the bottom roll H, going from there over an extra rod placed at J, and then to the thread guide L. The thread C is coming from an upper spool (not shown) upon which is placed the 20s yarn, and from there it follows along the line E, around the roll G, then around I, over the extra rod K, and then to the thread guide L.

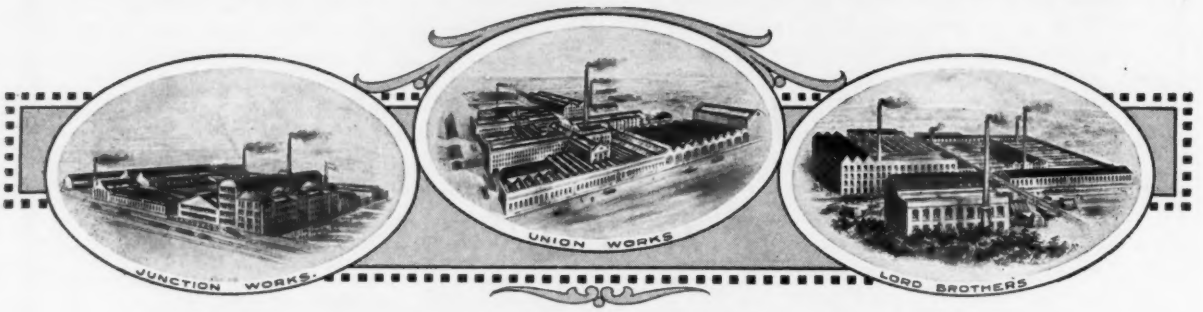
The small inset on the sketch shows the gearing plan, M being the gear on the end of the front roll, while N is the gear on the end of the back roll, these in turn being coupled together by the intermediate gear O, the arrangement being so geared that the 6s yarn will be run through the rolls at twice the speed of the 20s, which will allow the 6s to spiral or twist very loosely around the 20s yarn.

By a change of one or both gears, according to the ratio wanted, an entirely different appearance may be given to the yarn, which can be easily explained as follows: If the gear M is composed of 1½ times as many teeth as the gear N, then it will be evident that the roll H would have 1½ times the surface speed of the roll I, thus creating a surplus amount of yarn which is taken up by the manner in which it is twisted around the finer yarn.

This arrangement will not entail much of a change in the twisters, and the results obtained will prove enlightening. The exact ratio will be easily found by a very few experiments, and "E. L. L." will be better able to do this himself than by having anyone try to explain it in writing, as he knows the exact effect desired.

Benjamin (Conn.)

LORD BROTHERS



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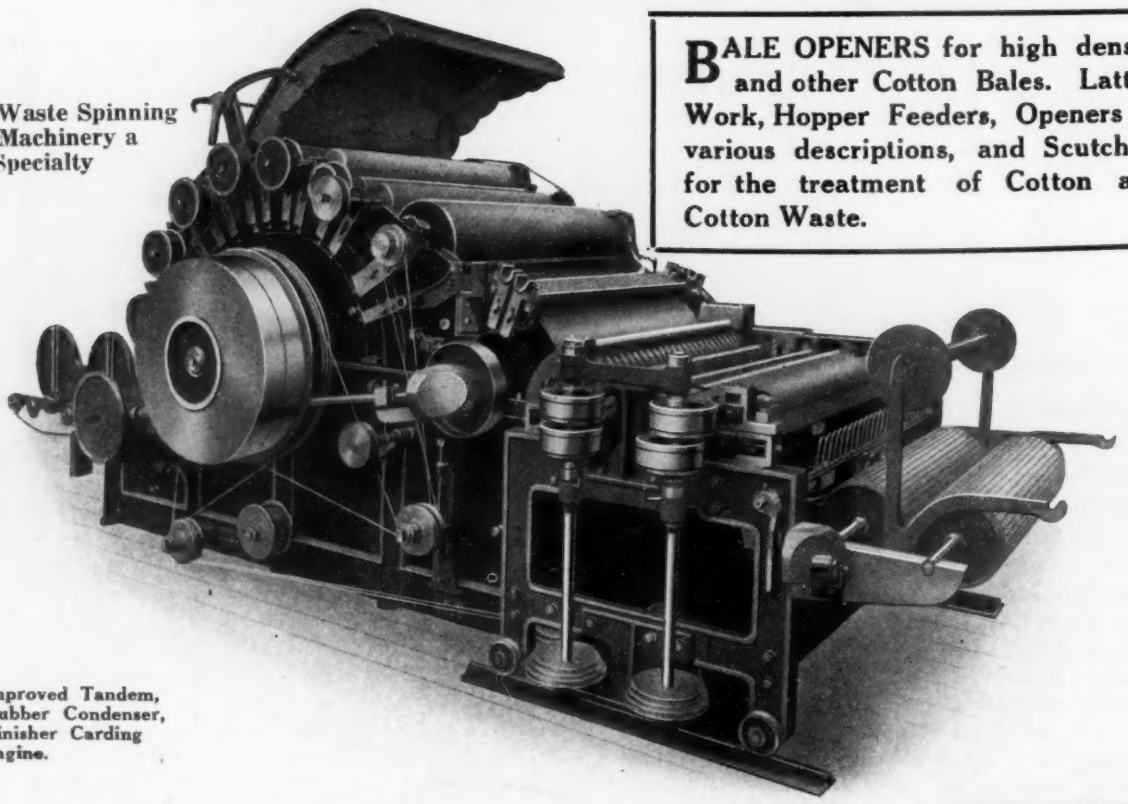

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The Cotton Card Traverse Roll.

EDITOR COTTON:

I shall appreciate having you publish in your magazine some information as to how a cotton card traverse roll is assembled. My question refers expressly to the method of attaching the shell part covering the traverse worm. A sectional view of same would be greatly appreciated.

H. E. S. (Conn.)

EDITOR COTTON:

In answer to the question by "H. E. S.," we would advise that the ends of the grinder shells are bored and threaded, one end to receive the solid shaft or pulley head, the other the hollow shaft or sleeve head.

The driving pulley is set screwed to the pulley head.

The differential motion which allows the shell and worm to revolve at different speeds and imparts the traversing motion to the grinding wheel, is connected to both the sleeve head and the long end of the screw which passes through it. The sketch makes the whole matter plain.

Whitin Machine Works

EDITOR COTTON:

As I understand his question, what "H. E. S. (Conn.)" wants is information regarding the general make-up of a modern traverse grinder for cotton cards, and I am submitting herewith a sketch which I believe will explain to him the general construction of most of the modern traverse grinders. (This sketch is not used as the sketch with the previous answer makes the answer of this contributor plain.—Editor.)

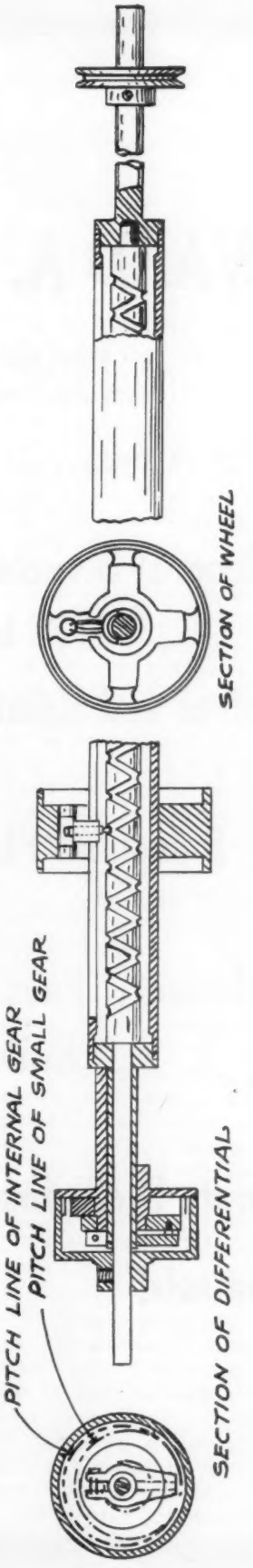
I would judge that the information he wants is principally concerning the method of fastening into the shell the two heads, one on either end. These are generally threaded into the inside of the shell with a very accurately cut machine thread and are tightened up very snugly and secured at the shop where the grinders are made, so that the joint is scarcely noticeable.

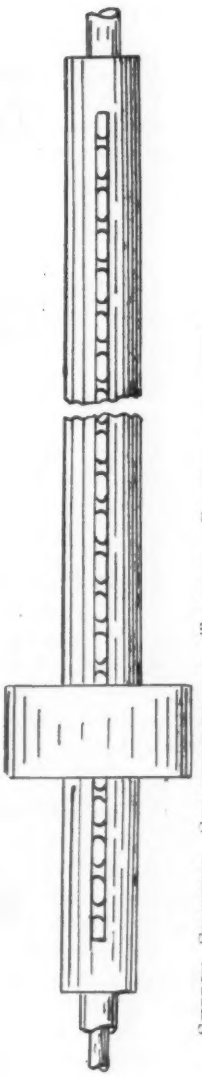
It is a mistake to attempt to take one of these grinders entirely apart in the average cotton mill machine shop, and I have known of several cases where practically new grinders have been spoiled in this way. The shops where the grinders are made have spent thousands of dollars building special machines and equipment for handling these grinders.

Any good mill man knows the importance of having a perfectly true and accurately balanced grinder, and a grinder cannot be taken entirely apart and then reassembled and then kept entirely true without the proper equipment. If a grinder becomes so badly damaged that it is necessary to take out the head at either end of the shell, I would suggest returning it to the manufacturer, who has the equipment to do this delicate job.

If there is any particular point on which "H. E. S." would like to have further information, I would be glad to have him bring the matter out through your valuable magazine and, if possible, I would endeavor to answer his questions.

H. C. C. (N. C.)





SKETCH SHOWING CONSTRUCTION OF TRAVERSE GRINDER FOR CARDS.

EDWARD A. STUHRMAN

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Paying on the Basis of Product.

EDITOR COTTON:

The cost of turning out the skeins, pounds and yards of product from the various departments in a cotton mill is the vital problem in every plant.

In the weave room the second hand, the section hand, the oiler, the filling carrier are so much increased overhead to add to price of the cloth per yard for weaving.

We finally determined to make a weekly rate based on yardage turned out. The continuous operation of the looms and the yards of perfect cloth all depend on these different extra jobs being performed at the right time and therefore ready before the loom was stopped for warp, for filling, or for repairs.

We took the average pay for the year past that had been paid to the various jobs, and made the same computation on the yards turned out per loom on the different styles of cloth, and the weaver's pay per loom per day and per week. Taking the average yardage on a section of looms for a divisor, we found on these day jobs the rate per week and per hour that they required to make a new wage schedule of day labor based, not on the hours of operation, but on the product of the room in yards and pieces, the average product. Then on the new year, we started with this rate, giving all the day hands, so-called, the chance to increase their pay, as they kept up, or increased the pieces turned out week by week. We also started a bonus for the reduction of seconds, oil stains and cloth imperfections, the amount increasing as the quality of the product came up and the rejects were less and less.

This making the day and the job work really one for the lower cost procured by increased production, proved very valuable. It brought out some of the weak places in our organization. First, we found that the labor that was used in bringing filling to the looms had been arranged to make a loafing time for one or more of the men. Under this other plan, there was a gain in work accomplished in reducing the time that the elevator was held up for boxes. The warps were sure to be waiting for the loom to be empty, ready on the truck to replace the empty beam.

Probably the most significant thing was the extra following up of the machine department for repair parts. We had supposed that there was some waiting, not often perhaps but semi-occasionally, but now we had new inspectors eager that no stoppage on their section should reduce the money in the pay envelope. It developed the peculiar fact that our repair bill for castings for looms was decreased. The fixer could not afford to have a loom stopped if there was any way that the part could be used. He also took care before the warp was out again on that loom to have a part ready to replace the one that was worn or broken.

The success we had with the weaving induced us to try the same system on the spinning and carding. It was but little more difficult to work out a satisfactory rate upon which the pay of the day labor should be based.

In the spinning, both on warp and filling, the weight of the yarn for the yearly average was used as the divisor. In the warp the section beam weights were used, and we found that by this method we could reduce the cost of the doffing and also the sweeping. When the hands found that the amount they received on the weekly pay sheet depended on themselves, and that the better running of the frames, and the least stoppage, resulted in the larger amount coming to them, they suggested a new method of doffing. At their own request, the arrangement of the numbers on the frames was so spaced that they were sure no frame would be too full when they came to it in its turn. We gave them the privilege of working with the section hands, who were also benefited by the larger product, and the doffing was arranged so that the crew that worked together had no lost time in emptying boxes, or moving doffing trucks.

They kept spare boxes ahead so that when the yarn was to be carried to the spoolers the whole crew went with the largest amount of full boxes that they could transport. This meant that the girls on the spooling had their work ready for them when they came in, and the spools were also filled and put on the warper creels more quickly.

The same general principle was used in the carding. The skein product reduced to average pounds and based as the divisor. The time of the hands was changed to the job rate and loss in product from stoppage for preventable repairs, this whether it was caused by letting a piece run too long or by careless work in putting on repair parts, largely stopped.

As the plan worked out by changing details as the weeks went past, we found that we had been too liberal in the number of day hands that each room had, and, as they left from one cause or another, we were able, as long as all the hands knew that it meant more pay for them, to actually reduce the cost of the departments in total payroll.

It means much to a plant to have all the costs decrease on an increased and more perfect product, and there is little gain in considering the day hand as a permanency. Each department needs a different method of handling that problem, but it is well worth the change, and the gain that results is one that is permanent. A. H. G. (Conn.)

Two and Three Process Picking.

EDITOR COTTON:

I am very much interested in the discussion that is appearing in COTTON in regard to the relative merits of two and three processes of picking. I have three processes at my mill. We tried two processes for several weeks, stopping the intermediates, but soon found that we could not get as even a lap at the finishers in this manner, and of course not so even work all through the mill. It stands to reason that a mill cannot cut out the intermediate pickers with four doublings and an evener and get as even work or as clean work. Evenness is one of the principal things in the carding department.

We are making a 14½-ounce lap and a 46 grain sliver. I believe in a heavy lap and a long draft, at least 140 to 150 inches. A long draft reduces the speed of delivery to the licker-in and gives it more time to comb out the fibers and, I think, it produces a more even and a cleaner sliver, owing to the greater bulk of cotton held at the feed rolls and the slow delivery to the licker-in. The heavy lap has less thin places than a light lap, owing to the cages being more evenly covered at the pickers. A light lap has more thin places owing to the light feed not covering the cages evenly.

We have two processes of drawing, doubling 6 at each process. I have tried three processes of drawing by putting the work through the finisher drawing the second time

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and the yarn was much evener and the breaking strength went up. I don't see how it is possible for some carders to stop one process of drawing and gain anything by it. If he gains in breaking strength he is pretty sure to lose in evenness. I would prefer three processes of drawing to two processes. K. C. (Conn.)

On Even Running Work.

EDITOR COTTON:

I have been reading with considerable interest the reports of the sectional meetings of the Southern Textile Association as they have appeared in COTTON from time to time, and note that lately there has been quite a bit of discussion at these meetings, and in your Practical Discussion Department also, on the subject of uneven yarn and its causes.

Not having been so fortunate as to attend these meetings and participate in the discussions, I would like to recount, through your discussion department, an experience of mine wherein a few changes in the organization improved the quality of our goods considerably.

At present I am running a card room of 39,000 spindles, with one vertical opener, three breakers with one three-blade beater in each of them, and nine single beater Kitson finisher pickers. When I first took this job, three of these Kitson pickers were being used as intermediates and they had to produce a lap of 52 yards every six minutes in order to keep up, and the other six machines were making a lap in six minutes and a half. A low grade Texas cotton about 1-inch staple, that contained some very deep tinges was being used to make 37s and 26s yarn which were going into 36-inch chambrays, on which we had 900 looms.

The work was very weak and ran badly, and something had to be done to improve the quality. I cut the speed of the beaters in the breakers from 1,400 r. p. m. to 1,200 r. p. m., and made a lap in seven minutes that weighed 29 ounces to the yard. In the meantime I built my fan speed back up to where it was, and of course made adjustments on the cleaning grids, and set the beater ¼ of an inch from the feed rolls, and got the air draft right in these machines.

Then I cut out the intermediates that were running a lap every six minutes with a beater speed of 1,450 r. p. m., and converted these machines into finishers. I have a carding beater in these machines. So now I have, as indicated, one opener, three breakers with one beater each, and nine finishers with one beater each—that's my picker equipment.

I cut the speed of the beaters to 920 r. p. m., set them to 1/8 of an inch of the feed roll, lengthened the draft on them, and made a lap of 15 ounces to the yard, 52 yards long, every 14 minutes instead of every six minutes. Of course, I increased the fan speed back up to 1,350 r. p. m.

Now, please understand, if I had the third process to put this work through it would be better than using two processes, as there would be more doublings, but I want to say that with the new arrangement just described, there was a decided change in the quality of the work, and we are now getting from 99 to 103 per cent production from the weave room; the yarn is rounder and cleaner and from six to eight pounds stronger in the break.

In making my changes, I of course got the fan speeds on these machines right before letting them go, and also made an adjustment of the grid bars, setting them with the proper circle for the sweep of the beater, and adjusted the striking edge of the bars so that they would clean the cotton as much as possible.

In explanation of this setting of the beaters and bars for a trashy cotton, I mean, for instance, setting the beater to 1/8 of an inch of the feed rolls, and the sweep of the beater to the first bar at the feed roll to 1/4 of an inch of the beater, dropping the circle or grid checks gradually so that the last bar at the bottom near the center of the beater is ¾ of an inch. This setting is to allow the sweep of the beater to have a tendency to begin to allow the fan to do its work properly and not pull the trash back through the bars, as the bars are set with a vertical pitch to the sweep of the beater, so it will frail the trash out and drive it through the bars. By having the beater set at 1/4 to 3/4 of an inch, it will release the cotton to the cages more evenly at the lowest bar, and the air current is weakened from the sweep of the beater at the lowest bar or bars, allowing the air on the cages to carry the cotton onto them, and letting the heavy particles drop on down through the bars to the floor.

Of course, this setting is to be used when running a very trashy cotton. With a fan speed of 1,350 r. p. m., against a beater speed of 900 r. p. m., making a lap in 14 minutes from a 20-ounce breaker lap and finishing it into a lap weighing either 13 or 15 ounces to the yard, I am getting very good results with these settings. However, for a good grade of cotton, I would advise closing the bars to a more horizontal pitch to the sweep of the beater, as this will allow less trash, or good stock, as the case may be. I am using the pin grids under my machines, which are a great improvement over the old bar if properly set to the right pitch or angle to the sweep of the beater, and this can be done to suit most all grades of cotton, according to the trash and motes it is desired to take out.

I would also like to say that, in my opinion, there are a great many picker rooms producing laps that should never go to a card, laps that will damage the clothing. The air draft on a picker and the setting of the cleaning grids are two very important factors in attaining good running work. You can't make a card do the picking any more than you can make the drawing frame do the spinning. It takes a lot of close study and thought, and a man must be interested in his job. It often happens that carelessness and indifference is the cause of a man falling short of success. It is sometimes the very little things that cause the big troubles.

In conclusion, let me say that I don't believe there ever was two processes of picking that would do as well as three processes, but I do say, and believe as firmly, that two processes of picking properly adjusted in every way, giving the proper number of beats per inch, with a good beater speed, is better than any three poorly adjusted processes of picking in the world.

J. F. L. (Ala.)

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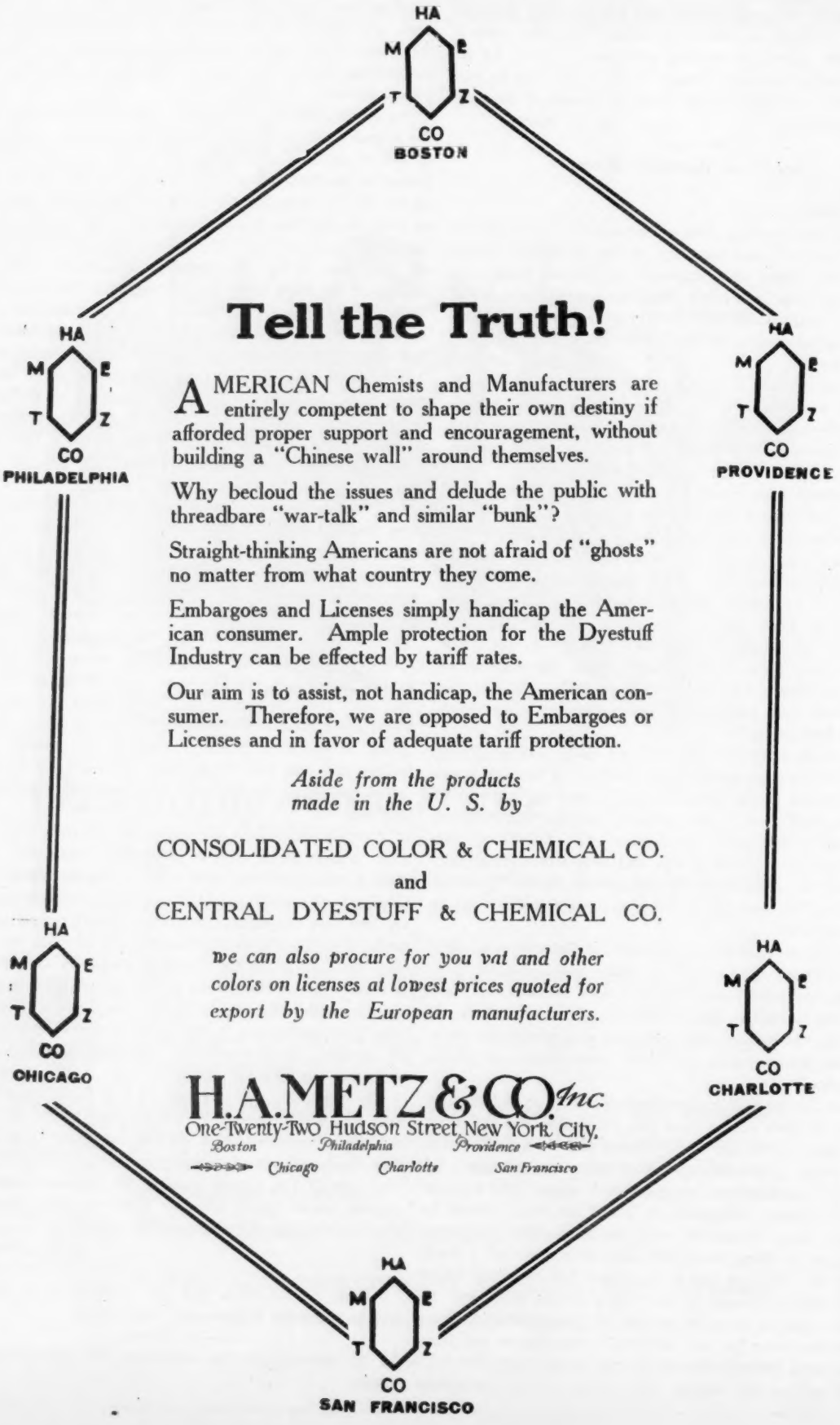

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Answers Question on Package Dyeing.

EDITOR COTTON:

In answering the question of "Wash (Conn.)," published in the October number of COTTON, requesting information on dyeing that will explain the advantage of dyeing the finished stock in the form of a cone or warp, I will assume that he means the package form of dyeing as compared to raw stock dyeing, and so will endeavor to give the practical workings of the two processes. The dyeing of yarn in the form of tubes, and warps on beams is the same mechanical process, the dye liquor being pumped from the inside out and from the outside into the package, the flow being changed every few minutes by means of valves.

The tonnage production is in favor of the tube package, when we consider the size of equipment and cost of operation. Perhaps the best thing to do is to compare chain dyeing with beam dyeing.

Chain dyeing is the method in most general use in denim mills. The yarn is made into a long rope or chain of, say, 400 ends, 5,000 yards in length, and is dyed by passing these ropes or chains through tubs provided with a system of rollers and heavy squeeze rollers to thoroughly boil out and impregnate the fiber with the coloring matter. After dyeing and washing and drying over steam heated cylinders, the warps or chains are re-wound onto a beam, an operation which requires a certain amount of skill and equipment that takes up space and which cannot be utilized for anything except to beam the warps.

In beam dyeing, the yarn is wound upon a perforated beam similar to the ordinary slasher section beam; the required number of ends and length of yarn for the "set" being divided so as to exactly fill the beams for the dyeing to be carried out in the same dyeing operation so as to insure uniformity.

The beams of yarn are fastened in the dyeing tank by connecting the ends of the barrel of the beam to the pipes from the circulating pump, the lid is fastened down and the dyeing commenced. The boiling out, dyeing and rinsing is carried out without moving the set from the machine, most of the superfluous water is removed by suction and the drying is done either by pumping hot air through the packages or by running the warps over slasher cylinders onto another set of beams. At this time the sizing is done and the warps are ready for the loom.

The chief advantage of the beam dyeing method is greater production per loom because of the absence of knots in the warp; the snarling of the yarn is entirely prevented while in chain dyeing there is always a chance of the yarn breaking or being wound around rollers in dyeing or during after processes. Less floor space is required as no re-beaming room is used and the dyeing room is much smaller. The dyeing is done in a less volume of water to the pound of stock so that approximately 60 per cent less steam is required. A saving of dyes and chemicals is effected through using the shorter dye bath.

Purer water is required for dyeing in package form as the whole process is filtration from beginning to end and any suspended matter or hardness is filtered out onto the fiber, making it harsh and unfit for use. However, this difficulty is eliminated by softening the water, and by using soft water better dyeing results.

The dyeing of yarn on tubes or cops is a great improvement over raw stock dyeing, the advantage being greater and better production in the carding and spinning departments because, as everyone knows, untreated stock runs much more evenly than dyed cotton, as all of the natural wax and suppleness of the fiber is retained. The operatives are more contented; there are no left-over lots from orders to be sold at reduced prices; the spinning is more flexible as several counts can be spun from the same stock; the carder keeps his room in better shape and all through the mill a greater efficiency and a better production is obtained.

When yarn for dyeing comes to the spooler, the cops are wound upon special tubes that fit in the dyeing machine; the twist is not disturbed and the correct amount of yarn to fill the order is wound and sent to the dyehouse. After dyeing and drying, the yarn is put back into the process of manufacture as a dyed yarn on tubes.

Other important advantages of this form of dyeing are: a great economy of steam in the dye-house, as only one-fifth the amount of water and steam is required as compared to the raw stock dyeing process; the twist of the yarn is nearer a match for white or undyed yarn; and ginghams and striped goods have a much more pleasing appearance caused by the white and colored yarns being of a more uniform texture. Then there is no waste from leftovers or snarled yarn, no colored waste from the card room to be a continual source of annoyance and expense by re-working the strips and waste into black.

The dyeing in package form has to be carried out under more exact treatment to secure uniform colors; that is for each batch to match the previous one, but this is comparatively easy when the dyer can have everything under mechanical control, pure water and the dye-house free from clouds of steam. In dyeing in package machines the dyer must have the selection of the best dyes suited for the work in the machines, dyes that are slow to exhaust, and as far as possible, he should avoid complex mixtures to match the shades.

The cost is cheaper compared with raw stock dyeing. One-fifth the amount of water and steam is used, the saving in dyes is quite an item, due to a more concentrated bath; the pounds per man is greater due to the more compact package.

I have had experience on both kinds of dyeing, and would like to hear from others, especially those in a receptive mood when there is a possibility of advancing the art of dyeing.

J. H. K. (Ga.)

G. G. Slaughter Machinery Company, textile machinery and power plant equipment, Greenville, S. C., announce the election of the following officers, effective from January 1st, 1922: G. G. Slaughter, president; James McCabe, treasurer, and J. W. Slaughter, secretary. Mr. Slaughter, the president, is well known to mill men, through his former connections as purchasing agent for a large group of mills, and his present representation of textile machinery and supplies and equipment. The new treasurer of the company, Mr. McCabe, has for some time been connected with the firm of Huntington & Guerry, Greenville, while J. W. Slaughter, the secretary, has been associated with the organization of Luther McBee, purchasing agent, with offices in Greenville.

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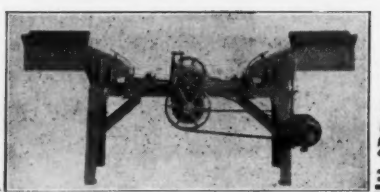

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A Scrubbing Experience.

EDITOR COTTON:

I have read the article on "The Scrubbing of Mill Floors" in the December number with much interest. A well scrubbed floor is a step higher up the ladder of cleanliness, whereas a dirty floor is a disease hole and not fit to walk upon, let alone work upon.

I would like for the reader to picture a floor that was not scrubbed for three days, and the room running 24 hours a day. Moreover, they used a certain grade of ring grease for the travelers a part of which went flying around the ring in a shower every time a frame was started up after a doff. Then when the floor was swept up, this grease was dragged along, covering up nearly all the floor and making a greasy alley. Then there were cardboard boxes at every other alley head for the men to spit in—those who chewed tobacco. Did they use the boxes? Yes, if the boss was around. If not they would spit on the floor which, together with the grease that sometimes was flying from the machines, made a very unhealthy and dangerous condition.

This room had three scrubbers and it seemed to me that the hardest work they ever did was "chin music." Nothing but talk, talk all the time. I was on a vacation when I went through this mill but I was interested. I asked one of the men who worked on the machines how much these scrubbers earned, and he told me that they drew as high as $30 to $32 a week if they stayed in until 2 o'clock on Saturdays. I nearly jumped out of my shoes!

I will admit that wages and help were high during the war, but think of a man drawing such pay for scrubbing 45 frames twice a week. Why, it was better to be a scrubber than an overseer.

Being a very close friend of the overseer in charge of this room I mentioned to him as we went around the room that it would be a good thing for him if he would look into his scrubbing a bit closer. He told me that he was not interested in the position he held inasmuch as he might be called into service at any time. (This was during the war period.) I reasoned with him about this part of it, and told him directly that he was not giving the firm a square deal and told him to brace up and stand by and work for the interest of the firm.

I asked him what he would do if he should come home some day and find his home one-third as dirty as the floor under our feet, while his wife was "chewing the rag" with her neighbors? He replied that he would tell his wife to keep his home clean. I tapped him on the shoulder and told him that was just the very thing the firm expected of him, and asked him to get interested in his scrubbers and keep the floor as clean as he would have his own kept.

Later on, when the time came for him to leave, I took my friend's position, and the first move I made was for those scrubbers. I had made up my mind that they were going to keep that floor clean at all costs. They told me that the other boss did not use them square, that if they worked one or two hours overtime he would let them out earlier instead of paying them for the extra time. They said they worked extra to get paid for it and were not satisfied to go home early. I pointed out to them that they were getting paid for scrubbing, that so long as I was in charge this would be attended to by them, and that they would get paid for all overtime work.

I next set about getting ten of my strongest men interested in my plan, and they said they would stay in every Saturday afternoon for two hours. I later named these men my "Team of Scrubbers."

I had two spooler trucks lined with zinc on the inside to a height of about two feet, with a hole cut in each side near the bottom. Running along the outside of the truck, and to its entire length, was a pipe which had ¼-inch holes drilled all around it, with a valve on the pipe near the hole in the side of the truck, as shown in Fig. 1.

Next I procured two new pails, on one I painted the word "Sand," and on the other the word "Soapine." Then I got two new mop handles and four "chubby" brooms and a 25-foot piece of rubber hose.

Having this equipment ready I set about laying out the men and placing them in their right positions, as I wanted them to know just what each was supposed to do when the bell rang, and then do it without a hitch.

At 11:45 o'clock the two trucks were filled with hot water and made ready for the bell. At 12 one man went up and down each alley sprinkling the sand, while a second

FIG. 1.

man followed with the soapine sprinkling it as was the sand. Two men started with one truck of hot water and as they opened the valves in the pipes, the water sprinkled onto the floor. Following this truck were two men side by side, each with a broom, scrubbing the alley. This prevented the water from making much headway under the frames. Two more men would start at the opposite end of the room and work similar to the others, with the last two men of the crew following and scrubbing each alley.

They would go over the alleys twice, then the windows were opened and the air would dry the floor, thus saving mopping. The first two men who sprinkled the sand and soapine would each take a mop and go over all the zinc under each frame, drying any water that had gotten away from the men with the brooms. This done, all hands would get together and start on the two main alleys, which were about 15 feet wide. Both trucks were filled with hot water, and after the sand and soapine were distributed, these two alleys were watered and then scrubbed over twice, after which one man would connect the hose for cold water and water first one alley and then the other. While the one was being scrubbed, he would play the hose on the other.

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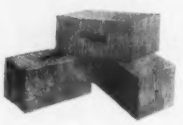

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All the dirty and greasy water was swept into the corner of the room near the wash room, where I had a hole cut out and connected with the drain. Then the two toilet and wash rooms were cleaned and washed.

Next morning being Sunday, I came around purposely to see how my scheme had worked. I found just what I had predicted—a fairly clean floor. Those boys certainly had chased the dirt away. And, mind you, that was only the first time, and the work was continued as the Saturdays passed by. Now the three regular scrubbers are washing the alleys every day instead of twice a week. Here's the answer, the more dirt that is chased away on Saturday makes less dirt for the regular men during the week, thus giving them a better chance to scrub alleys each day. Some people will say it takes too much water, but it doesn't. And how can you wash anything without water, anyhow?

T. A. B. (Mass.)

Comments on Picking and Drawing.

EDITOR COTTON:

On page 940 of the October number I read the very interesting mill experience related by "Contributor No. 3." In this letter he discussed the subjects of two and three process picking and one and two process drawing. I am interested in these features of yarn manufacture, and would like to give my views concerning them.

If I was in charge of a room where the cotton being run was of a low grade, and was running coarse counts, I would use three processes of picking and two processes of drawing. However, if a good grade of long staple cotton was being run and the mill was making combed yarns, I would use only two picking processes and one process of drawing. It is of course understood that this arrangement would be used only on fine yarns and a good grade of cotton.

I am giving below the lay-outs I would use for both coarse and fine counts. Taking up the coarse work, I would use a breaker, an intermediate and a finisher picker; then the cards, the first process of drawing and then the second process of drawing; from there to the slubbers, then to the intermediate fly frames (using only one process here) and then on to the fine frames and from there to the spinning.

If the mill was on fine combed yarn, I would use the following lay-out: Breaker picker and finisher picker; cards; silver and ribbon lap machines; from there to the combers and then to the drawing, using only one process; then to the slubbers, intermediates and fine frames and then to the spinning.

I am giving this information because "Contributor No. 3" requested that other readers write something along this line. I know of some of the best mills in the South that are using only two processes of picking and one process of drawing—and they are fine combed yarn mills, too. They are making yarn that they do not have to put in the warehouse, but something they can sell at a handsome price. Some of the spinners in these mills run as many as 15 sides.

These are but one man's views, though, and I am like "Contributor No. 3." Let us hear from "Wash" and "Tom" and the others on this question. Ted. (N. C.)

Asks About Metallic Rolls.

EDITOR COTTON:

I notice a good deal of discussion in regard to uneven work, and would like to ask the following question:

Should the flutes in the metallic drawing rolls be made to suit the grain sliver being run? For instance, if we were running a 45 grain sliver and should change to a 60 grain sliver and find that this weight of sliver brings the rolls up off of the bosses on each end of the rolls, what is the cause; is it that the pitch of the flute is too fine to imbed the sliver properly? If so, would it be advisable to change the rolls?

I would like to say just here that there is a lot of unevenness in yarns caused by this very thing, and a lot of bad running work results from this same cause. Now, if we had a mill so arranged that the preparatory equipment could not keep up with the other processes unless we changed from a 45 grain card sliver to a 60 grain sliver, then, when we made this change, would it be advisable to change and get a coarser pitch roller?

J. F. L. (Ala.)

Answers Benjamin on Card Clothing Wire.

EDITOR COTTON:

It was with great pleasure that I read the article entitled "Another Opinion on Card Clothing Wire" in the December number of COTTON and written by "Benjamin (Conn.)." The article has the same ear-marks as that of mine which appeared in the September issue and which was referred to by "Benjamin."

In his letter, "Benjamin" says, "What I should like to have 'Wash' explain is why he would change only his flat clothing. Is it on account of the uneven staple, or is it on account of the dirty stock? It strikes me that the uneven staple would require one type of treatment which would call for the finer type of card clothing on the top flats, while the low grade dirty feature of the cotton would call for more space between the card clothing points on both the carding cylinder and flats, but still retaining the difference between the numbers of same for the reasons already explained."

In my article entitled "Card Clothing Wire" in the September number, I make the following statement, "For this reason, it is sometimes policy to have the same number of wire on the flats as on the cylinder. The object is to give space enough for the foreign matter to enter between the points. However, this is done only in case of very dirty stock and waste." The point the writer wanted to convey is that uneven staple will not run to advantage, it always gives trouble in many ways, and in every case the product is uneven yarn. So, we must have the same amount of space between the points for waste as for dirt. "Benjamin" would give uneven staple cotton special treatment so the short staple would follow the web and afterward drop on every roller beam in the succeeding processes.

When I run stock uneven in staple, I take out as much of the short staple as is possible. Some may say that is expensive, but let me say that I know from tests that a great deal more is gained. Of course, this method makes the stock more costly, but this is more than off-set by the

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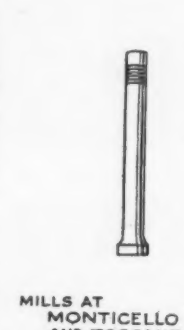

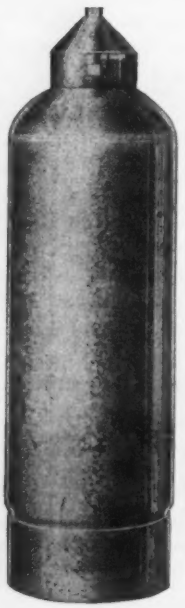

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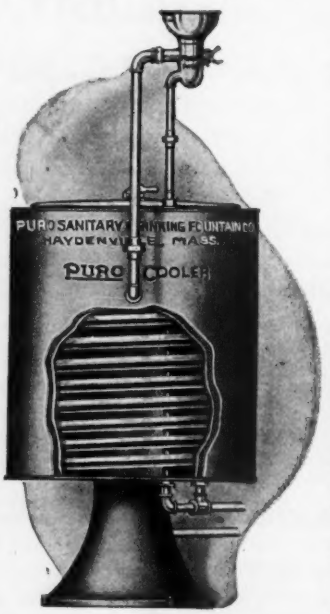

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production and quality of the yarn. On the other hand, with clean, even stock, less fibers (termed waste) are extracted from the sheet of lap and the flats act on a larger amount of fibers and for this reason should be finer and closer.

I hope the foregoing will be clear to "Benjamin."

Wash (Mass.)

The Value of Systematic Observation.

EDITOR COTTON:

These are days of organization, system and efficiency. Any plant which is not circumscribed by this triangle will be surrounded by dangerous pitfalls. With the keenness of present-day competition, no plant can afford to be without a close fitting organization which is well endowed with a strong system for economy. Anything which savors of waste of time, material or building space is a call for hoisting the signal of distress.

To prevent this combination, there have been several attempts made to devise the best system of observation in order to discover promptly the things which should not be allowed to take place. There is a best way to do anything. Present day affairs demand much more than the ability to repair things, and to remedy troubles after they have occurred. The men of present-day success are men who have the important faculty of being able to prevent undesirable things from taking place. This is the up-to-date call for the successful man of today.

The man who has this rare quality coupled with the ability to fix up rapidly the inevitable things which do occur, is fully equipped to grapple successfully with trade tactics. What is this rare ability based upon? The answer is: one good-sized, weighty word—observation. A man must expertly see what is going on around him, but it is impossible for him to know what is going on without being methodical in his manner of observation. Hit-and-miss looking around on a sauntering sort of a tour of a plant, or on an aimless round of the mill, without a definite plan of observation, will involve much loss of time, needless wear and tear of floor space and sole leather, also loss of efficieney.

In making observation tours through a mill it is not the amount of time put in, nor the floor space covered by the trip—it is the clarity of the observation.

There are all kinds of observers—the casual observer, the superficial observer, the keen, slow, cautious, and the downrightly intense observer. Illustrating our point, there was once a cotton mill owner who was known for his keen insight, thorough observation and unfailing success with his large mills. He was an exceedingly tall gentleman, and it was said that he would occasionally enter a spinning room and stand at one end of the frames for a few minutes, and upon his return to his office, he would send for his superintendent and tell him very nearly how many spindles were idle in the spinning room. The superintendent wondered how his treasurer could perform such a stunt without going up and down each alley. He had a notion that it was because he was so tall, that he could see over the frames and actually count all of the idle spindles, one by one.

But that was not the reason. This treasurer would start out with one definite purpose in his mind—to find out just how many idle spindles there were in the spinning room. And this is the simple way in which he reached his conclusive figures: He would stand at the end of the frames, and could see possibly all of ten sides of frames. He would count the idle spindles on these few sides, then average the result. This average he would multiply by the total number of sides, and then base his conclusions thereon. Sometimes he would hit the actual number just right. At other times he would be a few spindles off. As conditions average up about the same under the law of averages, he was generally quite correct in his deductions.

But it is not the correctness of the figures that we would laud. It is the unfailing principle of the whole matter that counts. He knew how to observe, and he knew what he wanted to find out.

There was another mill where the treasurer rarely entered the mill, and yet he always knew, by having an hourly report, just how things were going in the mill during the day. He had a young man trained to go through the mill every hour with a tally. This inspector would go through the mill and note on his tally how many machines were idle or stopped as he passed by. This treasurer knew, of course, just about how many frames should be stopped for doffing, etc. If the average of the daily sheets exceeded this reasonable amount, he would endeavor to learn the reason why. On the half-hour he would have the young man make an alternate inspection of each room with reference to the number of spindles stopped, etc.

This treasurer's mill was not a very large one, and he did not employ a superintendent, preferring to carry on the actual mill inspections by proxy, and to put his own time into the higher superintending and management himself. And his mills were very successful.

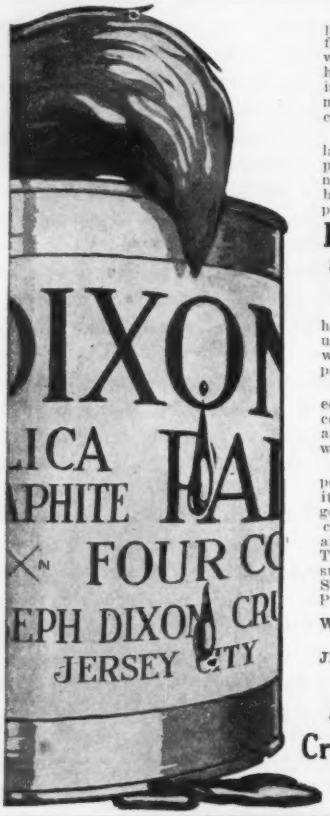
One of our most successful superintendents would go through his various mills once a day, and carefully check up all of his observations by the notes which he would enter in his handbook during his tours of inspection. The overseers under him had great respect for this superintendent's keen-eyed observations. They knew that his rounds meant a searching investigation and that what he did not see was not worth much consideration.

A successful mill agent had a queer method of inspection. It was said of him that he never made a thorough personal investigation while the mills were in operation. He would wait until his mills were closed for the week, and then he would go all through and make his most searching investigations. The reverse of this was in another mill where both the agent and his superintendent spent most of their time making observations in their mills, but did not always see everything which could have been seen.

It is a good plan, when starting out for a tour of observation, to have something definite in mind. The man who makes his rounds must be very much interested in what he is looking for and find out all that he can about the few things sought.

One superintendent was so immensely absorbed in his inspection tours that he would not permit himself to be interrupted during any of these trips. His whole attention was closely riveted upon the one thing of getting at the root of his investigations. Nobody was allowed to speak to him upon these trips, until he returned to his office, where he was always a liberal interviewer of his men, and always kindly approachable.

To be a keen observer is to have a method in one's way



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of making careful inspections. This method must be one which leads to the faculty of knowing how to know one's own business through and through, from the bottom to the top. This scope will give a man a firm grip upon all of the details required for the special service wanted. An expert observer will give his manufacturing a more solid foundation. This is the true value of observation.

Henry (R. I.)

Immigration Holiday Demanded.

EDITOR COTTON:

In some respects the subject of foreign immigration is not very closely allied to cotton manufacturing problems, while in other respects it is of great importance to manufacturers of cotton.

At the present time, propaganda is in circulation both for and against prohibiting or limiting immigration from foreign countries, therefore, we must thresh out the question, form our opinions and push these opinions to the limit, so that whatever action is taken will be the best. We, who have a foreign element working for us or with us, are better able to study the conditions as they really are, than the men who control the legislation of immigration laws and therefore it is our duty to not only register our opinions, but also to describe actual conditions.

Immigration must be systematically controlled, or we shall be pushed back in our United States just as our forefathers pushed the Indians back in their America. The Indians did not welcome our ancestors with open arms, but made them fight for every inch of territory, and still they lost their ground. Why? Because they gave way to a higher type of civilization. Now, if the present-day influx into this country represented a higher type of civilization than ours, we would have to give way to it, just as the Indians did. But I think it is very doubtful if such is the case, and therefore proper immigration laws will be unsurmountable. If the Indians had not been fighters, they could not have held this continent for so good men as our Pilgrim forefathers. At the present time, Indian deeds are relegated to story books or thrilling movies, so we must simply learn the lesson they taught us—to protect our country or become extinct—and apply it to our own deeds.

When the war lords looked at America with greedy eyes, we said, "Stop," with an emphasis which they had to realize, but, oh! how weak that rumbling army of conquest was with the clatter and rattle of steel, when compared with the silent and sometimes stealthy influx of individuals seeking to satisfy personal ambitions!

This silent invasion covers the land as a snow storm, quietly, quickly and powerfully, and like the snow flakes multiplying on a roof until there are sufficient numbers to adhere and slide off, collecting as they slide, so do immigrants adhere and collect and slide in, in ever increasing quantities.

Suppose we separate the immigrant into three groups and study them. They are good, bad or indifferent, and the indifferent ones are the only ones that are of any good to this country. A good immigrant loves his country just the same as a good American loves America, and their only purpose in coming here is to enable themselves to earn more money than they could at home. Their every thought is of the homeland. They work hard, obey our laws, live decently, but their heart is not in America's welfare, and in the day of need they forsake the country that has helped them and rush to their home shores. The only thing they do is to relieve some good American citizen of laborious work and help make him dependent.

The bad immigrants are all that the term implies. They were bad at home, are bad here and always will be bad. Their desire to work America costs us many dollars.

The indifferent class come here more as our own ancestors did, although their ideals are lower. They, perhaps, wander over here to see what the place is like, they have heard such wonderful stories from their good brothers who have returned, and their minds are more or less plastic. They realize the advantage here over their own country, study our ways and make this their permanent home, abandoning forever their native land. Their sons in future generations will become good Americans and be an asset to the country.

We cannot, however, make these three or any other distinctions of foreigners as they arrive, and we cannot comb out the indifferent ones and reject the rest.

The best illustration of their feelings toward this country is vividly shown when one of their number decides to take out his citizenship papers. From observation it has been found that all foreigners divide themselves into little groups, usually all that came from one section of the mother country banding together. When they have developed this social friendship they feel as though they were all friends of old. This is simply human nature. Suppose for a moment, a good American, even you yourself, should travel to a distant state to work and when arriving there, you should find a man from your home or a neighboring town. You would feel a strange friendship for that particular man even though you hardly knew him back home. This trait of human nature is the cause of grouping foreigners into small factions, mutually helpful to each other.

Now let us watch one of these groups. One of their number decides that America is a pretty good place, just a little better than his home land, and he is desirous of becoming a citizen. Immediately he is ostracized by his associates and all his former friends despise him. They try by every means to bring hardship upon him. He, on the other hand, attends school, probably, and meets Americanization committees who extend greetings to him, and for a short time he has happiness. But the great bulk of people do not know of his good intentions and he is bunted and kicked around with the rest of his countrymen. The result is that he feels that nobody wants him, and that he is almost a man without a country. The love for his children and the desire to give them every opportunity is the one power that induces him to make this great sacrifice and stick by it.

The individuals of the groups speak their native language, and if one tries to pick up a little conversational English he is regarded with the suspicion that he intends to take out papers. This prevents the majority from even learning our language.

These associations that form in this country are the worst feature of immigration. If we could take one foreign immigrant with his family and put him in a community where there were ten Americans, how long do you think he would talk his native tongue and stick to his na-

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tive habits? There would be no one to shame his desire to become an American and he would either enjoy it and stay, or else dislike it and go back home where he would belong if he did not want such a community at the start.

Suppose we cut off immigration for a number of years, and gave it a much earned holiday, similar to the proposed armament holiday; some foreigners would immediately return to their old country. With what was left we could develop good American citizens, which would be a benefit to the country. Then when we observed the changes we could so legislate immigration as to make it controllable.

Mill men remember when mills had no fences and gates and operatives went out to the store at will, and the kids from school came into the mill to play, but now all that is stopped. The time will come, and it's nearly here, when government business cannot be conducted efficiently with a gang running across the ocean to a European store to spend money and a bunch coming back in to play in our yard. M. W. H. (Mass.)

"F. J. (R. I.)"—Attention.

Will the subscriber who, on December 29, sent us a short letter reply to the questions of "B. C. A. (N. J.)" and "B. E. (Texas)," and who signs himself "F. J. (R. I.)," kindly advise the Editorial Department of his name and address? We shall be glad to publish the letter using the initials only, but it is our rule to not publish material of an anonymous character in these columns, and we require the name and address of the correspondent for record purposes, but not necessarily for publication.—Editor.

Cadillac Portable Electric Blower.

A handy device for the textile mill is the Cadillac portable electric blower. This device effectively removes dust and lint from all types of textile machinery as well as from motors, generators, switchboards, and other power plant equipment which may be kept clean in no other way.

A knitting mill reports that by using the blower for cleaning rib top and knitting machines they save 80 per cent of the time required to do the same work by hand.

The blower weighs but six pounds, has a ½-inch nozzle outlet, and blows about twenty cubic feet of free air per minute with a motor speed of 11,500.

This blower has a wide range of usefulness and does the work of elaborate and expensive vacuum and other cleaning systems. Even though compressed air is available, there are places where it is not practical to use it owing to inaccessibility. The Cadillac, being electrical, may be operated when the plant itself is not in operation, for it is only necessary to connect the blower to an ordinary lamp socket to bring it into action.

The Cadillac electric blower is manufactured and sold by The Clements Mfg. Co., 612 Fulton St., Chicago, Ill.

Another Answer on Card Room Questions.

EDITOR COTTON:

Answering the question of "Rocky Road" in the December number in reference to Woonsocket fly frames running over at the bottom, it is my opinion that if he has the proper lay gear on his frames to suit the hank roving, it would not be advisable to change the lay gear at all. His trouble is in some other place, and as he does not say anything about the frame running over at the top, only at the bottom, I would suggest that he examine the builder and also the builder dog, and also see that the screw in the builder which opens and closes the jaws has no lost motion in it. He should see that the builder jaws are not worn off into a rounded condition; they should be perfectly square on top; the builder dogs also should drop off suddenly at each stroke of the traverse. The rack gears should have no broken teeth in them—he should see to that in his investigation—and the gap gear on the end of the upright builder dog must not have any of the teeth worn off where the teeth come in contact with the bevel gear at each change of the builder. If there are any worn teeth here, it will cause a dwell of the carriage at the changing and the roving will pile over the end.

He should also make certain that he has no backlash in any of the driving parts, from the lay gear all the way through to the back shaft that carries the racks. If this doesn't remedy his trouble, he should then change the taper gear, but neither the lay gear, if he has the right lay gear on to give the proper number of layers on the bobbin to suit the hank roving, nor the teeth in the lay gear should be altered.

If the foregoing doesn't help "Rocky Road," if he will furnish us with the number of hank roving he is running, we can give him the teeth he should have in the lay gear to suit it. He must of course have his frames level, and there should be no dwelling of the carriage at each change of the stroke in the carriage. It may be that he has the wrong lay gear on, but I cannot tell this without knowing what hank roving he is on.

In regard to the subject of fan speeds, brought up in his second question, a fan speed should be strong enough to place the cotton properly on the cages; the fan should run fast enough to not allow the cotton to be taken back over the beater. Yes, he will have more heavy particles that will drop through the bars and fall on down if the draft is not too strong. He should be careful, though, to not get the draft too weak to properly fill the air spaces on the cages.

In his third question, "Rocky Road" asks for a remedy that will stop small particles of cotton seed and other foreign matter from lodging in the card flats. He should notice the spiral brushes on the cards. If they have been running for a long time in one direction and the bristle is laid back on a slant, they won't clean the flats properly. He should turn the brushes around, changing the pulley, and then clean the tops out good with a burnisher brush. He must take care to not set the bristle any deeper than the knee in the wire on the tops. If he does, the brush will pack the motes and trash in the wire instead of brushing it out.

J. F. L. (Ala.)

A System of Mill Accounts Outlined.

(*Continued from page* 263.)

tered on the report of supplies and repairs. The keeping up with the purchase of supplies and repair parts, together with the issues of such, while simple in theory, is difficult in practice, unless there is a man who has charge of these parts.

This record should be kept on large loose leaves arranged in columnar form, suitably headed and designed as a perpetual inventory, showing daily accessions to stock and issues therefrom. Therefore it may seem that the keeping of a complete record necessitates extra work and some expense. Many managers fight shy of any additional expense that can be avoided and the result is that in a good many offices only such accounts are kept as cannot be dispensed with.

Most accountants agree that it would be well for the management to know each month its exact financial condition as may be disclosed by a statement of assets and liabilities, with the complementary statements of manufacturing cost, general sales (less expense of same), with the gross income account and deductions therefrom. In order to find the costs and values, a systematic account keeping should be maintained and the reports and statements constructed in the same manner each month.

The average factory will find the following chart of accounts to cover its general needs. There may be need of greater detail for some, and others may consider it too comprehensive. Again, others may prefer different captions for some accounts.

CHART OF ACCOUNTS.

Inventory Accounts.
Raw Materials.
Materials in Process.
Partly finished product.
Finished product.
Supplies.
Miscellaneous inventories.

Productive Labor.	*General.*
Superintendent	Steam Plant or Power
Department A	Yard
Department B	Overhead
Department C	Machinery Repairs
Department D	Depreciation
Miscellaneous.	Misc., General Labor..

General Expense.	*Selling Expense.*
Salaries	Freight Out
Office Expenses	Drayage
Interest	Commissions and Discount
Insurance	Samples
Taxes	Other selling expense
Building Repairs	
Miscellaneous.	

Sales Accounts.	*Other Income.*
Sales	Rent Receipts
Miscellaneous Sales	Interest Received
Waste Sales.	Misc. Receipts.

What Makes the Spindles Break?

EDITOR COTTON:

How can I prevent the breakage of spindles? We have two mills, each of which contains 25,000 spindles. One of the mills is on tape drive, and the other is on band drive. I find there is practically no breakage of spindles on the tape-driven frames, but we have had some broken on the band drive. I would like to have the readers of COTTON tell me whether this breakage can be prevented, and if so, in what manner. B. Y. L. (China.)

Answers for Correspondents.

EDITOR COTTON:

I would like to give my opinion on the first question of "Rocky Road (N. C.)" published in the December number of COTTON, in regard to the running over of roving frames at the bottom. I would say it was his skip gear or gap gear. Possibly it is too large or a tooth or two worn out, or perhaps it is the spring which forces the dog around at each change. This spring might not be strong enough. I am stating these only as possibilities, as they could be the reason for his difficulty.

Also, I would like to answer "B. C. A. (N. J.)" who asks, also in the December number, what is the cause of roving coming through the rolls on a spinning frame without being drawn. In considering his difficulty I would say that he has too much twist in his roving in the spinning frame creel or possibly his weighting might be wrong. A three-pound weight would be practical on 30s provided his rolls are lever-weighted, but I would say the roving has too much twist, for this causes grooves in the rolls and also causes a hard roving as "B. C. A." indicates is the case in his instance. J. R. (S. C.)

New Equipment at Georgia Tech.

There has recently been a substantial increase in equipment made at The A. French Textile School, which is the textile department of the Georgia School of Technology, Atlanta, Ga. The latest installation of machinery made at this school is a set of preparatory machinery for the spinning of yarns. This line of machinery was installed during January by the Whitin Machine Works, of Whitinsville, Mass., and includes one improved Whitin card, drawing frame, sliver lap machine, ribbon lap machine, comber and spinning frame, all of Whitin make. The new spinning frame is operated by a 5-hp. motor made by the Westinghouse Electric & Manufacturing Company especially for spinning frame drive work. A Link-Belt silent chain carries the power from this motor to the drive shaft of the frame.

Another recent installation at this school is a complete set of improved high duty head air conditioning equipment made by the Parks-Cramer Company, together with an atomizing system. A Culver banding machine has also been placed in operation in the yarn department of the school.

Other recent additions to the equipment at the school include a ½-hp. Watson motor for loom work, installed by the Mechanical Appliance Company; a terry towel loom made by the Draper Corporation; a Stafford Company combination loom; and an experimental kier manufactured by the Textile Finishing Machinery Company, Providence, R. I.

Director C. B. Seal of the textile school advises that the new combing and spinning machinery is now being put into operation, and states that the school extends a cordial welcome to any cotton manufacturers or others interested to visit the school at any time and inspect this and other equipment there.

A Comber Question.

EDITOR COTTON:

Can someone tell me through your department, "How Other men Manage," why feeding later on a Whitin comber makes more waste? Law (Mass.)

Correction.

EDITOR COTTON:

In my letter entitled "A Question About Bobbin-Lead Frames" in the January issue of COTTON, there are two mistakes which I think should be corrected. In the third paragraph I make the following statement, "We all must admit that the pressure is very great to be able to drive the spindles when the frame is up to speed." This should read "bobbins" instead of "spindles." A similar mistake appears at the end of the last paragraph of the letter.

Wash (Conn.)

Strikes Do Not Avail.

Statistics recently issued by the United States Bureau of Labor Statistics show that since the close of the World War, organized labor has worked into an inferior tactical position. In 1916 employers won 727 strikes and employees, 733. In 1917 employers won 382 strikes, while the employees were successful in 614 cases. In 1918 the employees kept their lead, but in 1919 the employers had 661 victories, as against 565 for employees. In 1920 employers won 633 strikes and employees 360. During the war days organized labor held the whip hand in industry and figuratively speaking, drove a willing horse to death. In 1919 and in 1920, the situation changed. Resistance was strongly manifested in the form of employers' associations, while the favor of public sentiment passed from the workers because of their exactions. In 1920 1,511 strikes were due to disputes over wages, 306 to wages and hours, and 71 to hours alone. In the five year period, 1916 to 1920, about 30 per cent of the strikes called for recognition of unions or miscellaneous demands.—*From an industrial digest published by Sherman Service, Inc.*

The registration for the spring term at the North Carolina Textile School, which is the textile department of the North Carolina State College, has advanced to a total of 175 students. Among the students registering were three Hindus who came direct from Bombay, India, to take the textile course at this school. A Chinese student also registered last fall to take the regular four-year textile manufacturing course, making a total of four Chinese enrolled as students at this school this year.

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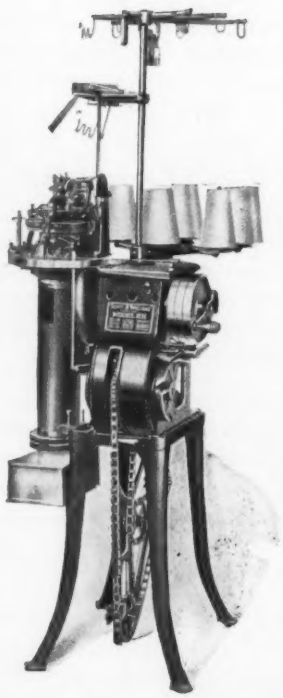

Ribbed top made on two sets of needles.
Automatic transfer from ribbed stitch to plain.
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Each stocking is dropped from the machine when finished.
Each stocking is automatically started upon the empty needles, producing a French welt without drawing thread or cutting, no ends of any kind to be removed.
Machine is fitted with five yarn fingers.
Provision is made for high spliced heel and double sole.
Provision is made for ring top and ring toe.
Speed of machine about the same as Model K.
Production about twelve stockings per hour on 3¾"-220 needles.
One operator can take care of the same number of machines as Model K.
The machine is built in all gauges.

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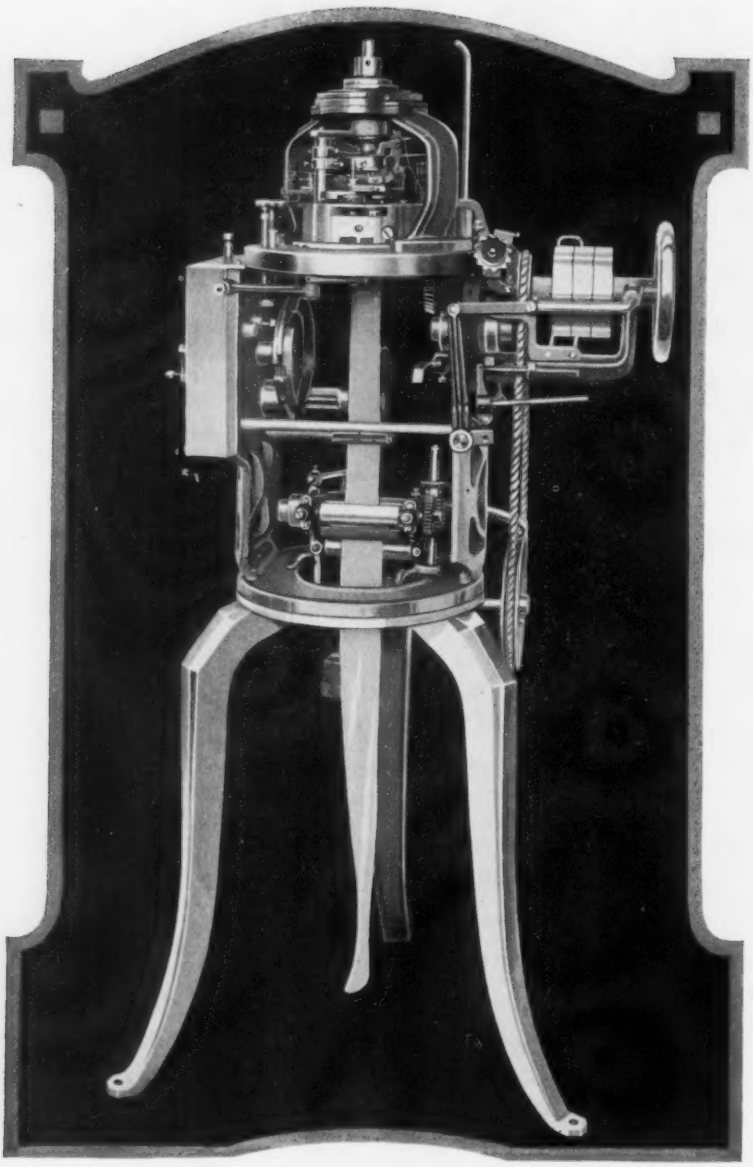

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On request we will send the "Wildman Ribbing Machine Catalog," giving detailed illustrations and descriptions of every important part of the machine.

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An Automatic Machine for Children's Hose

BY WILLIAM DAVIS, M. A.

The children's hose trade is one which requires specialization and a certain type of trained skill, for in this branch we are dealing with articles of diminutive size where minuteness is the chief desideratum. There is little difference in the essentials of construction except that the diameter of the machine is much smaller usually about 3 to 3¼ inches and the machine here described is widely used for this purpose.

The whole arrangement of needles and the cams for working these are given entire in the accompanying diagram, Fig. 5, where the chief parts are indicated by name. Examining first of all the arrangement of needles and sinker or web holder, these will be noticed at the top of the sketch. The needle is of the latch variety and the diagram shows it with the latch shut as in the act of descending after drawing the loop. The sinker is shown working in conjunction with the needle where the throat of the sinker will be noted followed by a pronounced bulging portion to the right; further, on the extreme left, will be noted the raised portion from which the sinker receives its motion. The sinkers may be seen to be seated in a sinker ring which keeps them in regular arrangement in relation to each other and on the right will be noted a section of the cylinder, over the front of which the fabric proceeds down the inside of the machine.

This machine is built on the revolving cam principle, that is the cam boxes revolve and carry their cams to operate on the butts of the needles; that being the case, the needle cylinder and its needles remain stationary and along with it the fabric inside the machine. This is one of the advantages of the stationary cylinder principle, the work does not revolve as is the case with the revolving needle cylinder when the work has to rotate with it and in so doing the article has also to swing round in mid air and receives a spiral twist. To combat this, most modern machines have an arrangement for cutting off each separate article of hose as it is made so that the spiral twisting has only reference to the one article being manufactured. It should be said that modern practice is favoring more and more the machine with the revolving needles because of the greater advantage in higher speed and it is regarded to be conducive to a more even texture to have the heavy cam parts stationary. One disadvantage of the revolving cylinder machine is the fact that as the fabric revolves also, the worker cannot notice defects in the texture so easily because on account of the high rate of speed the eye cannot follow the swinging piece of fabric. When the fabric is stationary, the smallest defect is noticed as soon as it occurs on the needles.

The position of the needle after drawing the loop is shown in Fig. 5 in the sinker and needle arrangement above the bed of the cams. At this point the needle has just reached up for the new thread and is descending with this in its hook with the latch closed. At this point the new yarn is just about to be dropped from the "chest" of the sinker and to enable this to be done the sinker will move to the left to clear, and this done, the sinker moves once more to the right to its normal position between the needles. When the needle rises again, the sinker will be able to hold the loops down on the needle stems and thus clear the needles for the reception of a new supply of thread for the next course of loops. Where the sinkers are drawn out towards the left, the sinkers ring is open and inside it is a cam which gives the sinkers their inward movement, which can be plainly seen from the outside of the machine.

Knitting Cams.

The arrangement of knitting cams can also be traced by an examination of Fig. 5, which on this occasion is shown in full so that the manner of actuating the needles in the machine may be followed. The general appearance of the cam arrangement is similar to that of the machine described in the last article, but there are several important features belonging to this particular make.

The actual names by which those various cams are known in the trade are shown on the sketch, and beginning at the left-hand of Fig. 5, we may distinguish the following: Needle rest cam, this extends for the most part of the circumference and constitutes the normal ledge of the machine on which the needles can ride when they are not required to knit. Adjoining this cam will be noted the l.h. upthrow cam, l.h. being a contraction for left-hand; and next in sequence will be seen the left-hand stitch cam connected, with which is a snap cam. This snap cam, in its normal position as shown on the left side is closed for all needles entering from the left and as they pass with their butts along the raised part of the left-hand stitch cam, they are pushed up so that the needles may receive their thread from the thread guides. No sooner are the butts over the curved tops of the stitch cam, than they come against the left side of the sliding cam, socalled in this case because of its faculty for sliding to the right to receive the needles from the left, and to the left to receive the needls from the right. This side to side sliding cam is a distinct feature of this machine. The center cam is shown in the sketch to form a groove with the right-hand stitch cam down the side of which the needles pass. On reaching the extremity of this groove, the needles are again restored to their normal level by passing up the side of the right-hand upthrow cam when they pass on to the needle rest cam, where they ride until knitting is due to recommence.

In following this motion, it should be distinctly understood that the cams travel round to the needles, the needles, therefore, have only an up and down motion imparted to them in knitting. In examining this sketch, therefore, it is more correct to say that the cams travel towards the left against the needle butts and this is the motion required for the ordinary process of knitting. One needle is shown in the path of the cams at the lower end of the right-hand stitch cam and this, if followed upwards, will show exactly how the motion is communicated to the hook of the needle in the operation of stitch formation. It will be noted that the right-hand stitch cam also has a snap cam attached, but its position in the sketch is open, this means that the needles in passing through the groove easily overcome the resistance of the spring which holds it against the stitch cam and the needles pass through

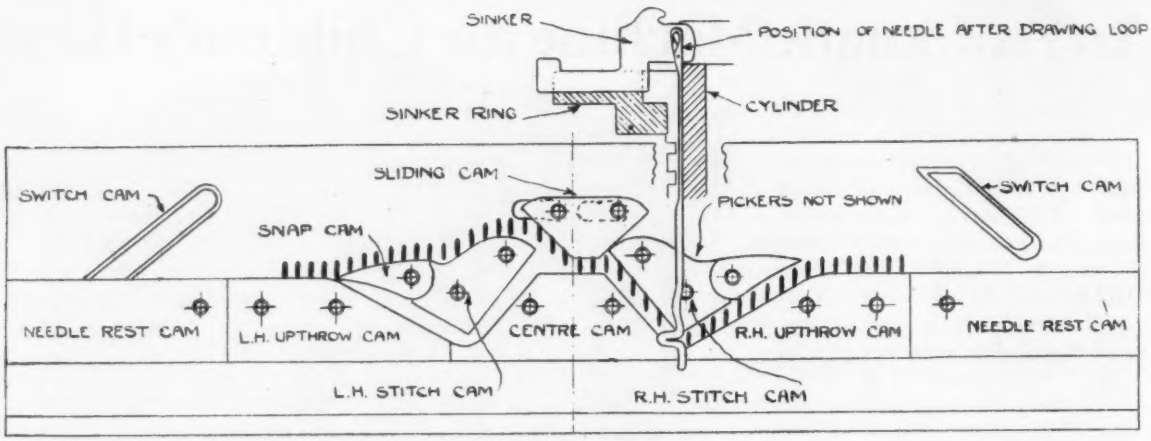


Fig. 5

the groove on to the normal ledge of the machine.

Knitting on Heel and Toe.

As has already been explained in these articles, the cam arrangement must provide for the knitting operation to be carried out when the machine is making plain knitting for the leg of the article of hosiery when the cambox travels round the needle butts continuously towards the left. When knitting the heel and the toe, for these two parts are made exactly the same, it becomes necessary to have a reciprocating motion of the machine, that is, the cambox travels first to the left and then to the right alternately. The motion to the left has already been explained and we will now consider what happens when the machine reverses the motion of the cambox, and the movement is toward the right. When the motion is reversed the snap part of the right-hand stitch cam is closed so that the needle butts do not enter here but ride along the top of the right-hand stitch cam and are pushed up by the raised level at the left of this cam in order to take their threads from the thread guide. When this is done, the needle butts are then against the sliding cam, which slides into a position to the left ofthat shown in sketch, so that the needle butts are enabled to pass under the right-hand edge of this cam, and are hence made to enter the groove formed by the left-hand stitch cam and the center cam. On reaching the bottom of this groove, the butts are raised by the left-hand upthrow cam, and on reaching the snap cam, the butts push it open and emerge on the normal ledge of the knitting machine. It will thus be seen that with the assistance of the sliding cam which moves in a slot for a short distance on the right or left of the center position, along with the snap cam which is forced open by the needle butts coming through from the inside of the groove, knitting can be performed in both directions as required for making the heel and toe of the article of hosiery.

From the description of how the heel and toe are made given in a former article, it may be sufficient to indicate the position of the pickers in relation to the cams of the machine under consideration, for the method of fashioning those parts is the same and is carried out by the picker system. The pickers in this machine are located at the top of the stitch cams, there being one picker for the right-hand stitch cam and a second picker for the left-hand cam. The position of the pickers is indicated by the words "pickers not shown" but they are placed in the machine just at this point suitably arranged at the groove of the cam so as to catch the needle butts as they come along the top of the machine. These pickers are used for placing the needles out of knitting position at each side of the knitting during the reciprocating motion, the picker on the right hand catches the end butt of the needles during the leftward sweep of the cams, whilst the left-hand picker catches the end butt during the rightward sweep of the cams. In both cases the momentum of the moving needles causes the picker to sweep upwards with the butt in its mouth and leave it on the higher level at theidle groove, which in this machine will beplaced on a level with the top of the sliding cam, because, when butts are at this elevation, they cannot be knitted as they are out of reach of the knitting cams. Similarly, when the narrowing is completed and it is desired to retrace those fashionings and replace the needles in work on each side again for the second half of the heel or toe, depressor cams wait at the exit from the idle groove and take down the needles on either side as was described in the first article of this series.

All machines of this type have an arrangement for putting all the instep needles out of action preparatory to making the heel or toe, and Fig. 5 shows on each side what is termed a switch cam which fulfills this purpose. In making an article of hose on the Griswold knitter, these instep needles, that is, the needles on the back half of the needle cylinder, are raised up into the inoperative position by hand, but on the automatic this is done by means of this sliding cam switch cam. In conjunction with these switch cams we have the high butted needles on the back half of the cylinder, these butts projecting a little further from the needle tricks than the shorter butted needles, and as a result, these switch cams are adjusted to take the long butted needles only. By a stud on a chain, the switch cam on the right is brought into action and catches the big butted needles as they revolve and takes them up into inoperative position by sliding up the right hand side of it. Similarly, when the heel is finished, those needles are brought into operation again by bringing into action the proper switch cam where the high butted needles are caught by the under side of the switch cam and forced down into knitting position once more.

[This is the second of a series of articles on knitting mechanism. The third will appear in an early issue.]

The Knit Goods Market

The 1922 knit goods market made no flying start. It showed remarkable improvement by the end of January, a month of waiting while inventories were being scanned and chronically slow-paying dealers were being called to state whether they would mend their ways or get out of business. A lot of the little fellows had to give up; some had planned to do so, judging by the manner in which their obligations to manufacturers and jobbers were treated. Those referred to as in this category quit with no stocks to be put on the market at sacrifice prices. They had cleaned up as if in preparation for letting creditors straighten out affairs as best they might. It was noted that during December last many small merchants paid small sums on account of long past due invoices, thus procuring an extension until after the holidays, which, for merchants so training may have yielded a harvest. The holiday business, however, was not so profitable, from the standpoint of sales, as had been anticipated, and this fact was responsible for more dropping out than really was looked for by even the pessimistic among sellers.

According to a leading jobber, an official of the Jobbers' Association of Knit Goods Buyers whose annual meeting was held in New York on January 16, retail business fell off materially during the last quarter of 1921. In the circumstances, the retailers were not buying to any extent for 1921, and as business was quiet with them they seem inclined to believe lower prices were in sight for goods for consumption in the last half of the year. This attitude of retailers necessarily is reflected in the ultra-conservative operations of jobbers, except as relates to silk and wool hosiery lines and low end and very high grade of types of winter underwear.

"Prices will not be lower," an executive of one of the larger underwear mills states with a positiveness that commands respect for his prediction. "If there were anything in sight on which to predicate a belief in a decline," he said, "we certainly would know it, for I believe we are as close to the raw material market and have looked as far into labor cost as any mill management in this country. We are not doing a great deal of business, and need orders to keep our help employed. We've reduced wages in the last month, and that was figured when we named present prices. If we thought a price drop might be possible we assuredly would meet it right away and get some of that business that ought to be coming in now. We are absolutely sincere in telling our customers they cannot buy goods this year for less and that they probably will have to pay more. If we deceived these customers and the market did decline, we would lose possibly one-half of them. It must be apparent to the trade that in adhering to prices and declining business at recessions we mean what we say about values.

"It is a very great mistake," this mill head went on, "for manufacturers to be swayed by the whims or beliefs of their customers and sell their product at sacrifices. They could keep their mills going, but could make no money, and eventually competition from other manufacturers, some of them no better able to sell at or below cost, would drive them to the wall. Besides, it is only the selfish merchants who profit by manufacturers' losses. They seldom pass their gains from advantageous purchases along to the consumer. All of these dealers, maintaining unnecessarily high overhead, could do more business if they adjusted store management to conditions, as has been necessary in the conduct of factories, and sell at normal profits. Of course it is quite natural that the little shop keepers, having cultivated extravagant habits when it was as easy to sell goods at fancy prices as it was to buy from mills at highly profitable prices, want to continue to revel in luxury at the expense of the consuming public. But the consumer balks at this, hence the drop in sales and the higher prices for what is sold, to compensate for losses of contemplated profits on what was not sold. High prices call for high wages; high wages get in the way of production, and there you are," the mill man concluded, resting his case with the public at large and the retail merchants as a class.

It is stated by the sales manager of a large underwear factory that the company has sold not more than 30 per cent of its production for spring, whereas, dealers should have completed their initial purchases some weeks ago. This mill specializes in fine underwear of bleached combed peeler yarn, for ladies, and has established an enormous business in this one line alone. That prices on the number in question are not likely to undergo any reduction is made apparent in the situation as to the character of yarn used by the mill. In the early part of January it was found that the yarn coming out of the bleach was stained. Careful investigation proved that the defect could not be attributed to any fault in the bleaching. The spinner from whom the yarn—40s single combed peeler—was bought, traced the stain to the cotton used. "There is a scarcity of good cotton of the kind you specify for your yarn," the spinner told the underwear mill management. "I bought the best to be had at the price to which I was restricted by the limit you put on what you will pay for yarn," he explained.

The entire lot of yarn, 222 cases, was rejected by the mill as not up to its established standard. The incident is taken to mean in the trade that combed yarns will remain high, because of a scarcity of good white cotton, and is regarded as a warning to dealers that they are missing their best opportunity of the year by deferring purchases. There has developed a situation as to cotton and yarns in which distributors can no longer dictate mill prices.

Along in the latter part of December and early January, it is disclosed, a number of small but presumably solvent retailers submitted cancellations of spring underwear orders. Some of those who went into an explanation intimated they were doubtful as to what might be their financial strength when invoices matured. In a vast majority of such cases investigated by one establishment, which had received a remarkable number of cancellations, it was found this was a flimsy pretext for repudiating orders—that the dealers were for the most part playing for lower prices. They are meeting with no success in this direction so far as the establishment referred to is concerned, for it accepts no cancellations except to spare itself losses through failures.

Some of the dealers put up a different front and recalled their cancellations when it was shown to them that their representations as to doubtful financial responsibility were being transmitted to banks in their respective commu-

nities. They were inadvertently impairing their credit through the means sought to be employed to evade their merchandise commitments.

A number of transactions in seasonal knit goods are being held up while the warning finger of some banking institution is raised. In their scanning of inventories the banks are making a close study of the values written into the stock sheets made up as of December 31. Where values are found to be radically high they are required to be reduced before banks will consider the extending of credit. And some of the manufacturers and jobbers are studying inventories as closely as are the ultra-conservative banks. In this respect January made progress in a reconstruction of credit, the putting of business on a more substantial basis.

A New York State jobber says the retailers who have been maintaining exorbitant prices will receive a jolt between now and the period when the consumer begins buying for spring. Most of the haberdasheries, this jobber says, are too bumptious. They have played for low prices when buying and high when selling, but went too far. In one instance underwear was specially priced $4 a dozen to a retailer on his representation that he would make a drive with it at 50 cents per garment. He priced it 69 cents and business with him in that line dragged. He had squeezed the seller and sought to pinch the buyer, following an example set by four retailers in several cities in the Central West. They were permitted to buy a high grade cotton heather stocking for ladies at $4.12½ a dozen on the promise the hosiery would be sold at 50 cents. One displayed it in his window bearing an 89 cent price tag. This led to an inquiry by the accommodating seller, who found that none of the dealers had priced the garments 50 cents—that the lowest was 59, others being 69 and 79.

Jobbers and manufacturers are tiring of this sort of deception, and while there is a general desire that there be a minimum of government interference in business, the proposed raid of the Federal Department of Justice on the profiteers, it is felt, would have a wholesome effect on industry and benefit the consumer without hurting interests in between.

The market for knitted goods, like that for textiles generally, received a jolt on the first business day of the year, which witnessed decided drops in cotton, wheat and crude oil, and it was not until after wheat and cotton recovered that the market took on its first show of activity for the year. This came with duplicate orders for spring underwear, for small quantities of course, and chiefly for ladies' wear. None of the mills were enthusiastic over the volume of duplicate business, but there was enough of it to again indicate that stocks are light. This condition, which is known to exist generally, augurs for active buying henceforth. It was renewed during the week beginning January 16, when buyers were marshalled for the annual meeting of the National Wholesale Dry Goods Association. Many of the attending buyers were shopping around during the preceding week, some placing orders, the majority obtaining memoranda to be submitted to their respective merchandise managers. The meeting of the jobber representatives necessarily attracted many mill heads to the primary market, and it is the common belief that during January a very substantial business was done—that a number of establishments not only completed their purchases for the first quarter of the year but bought fairly heavy into the second, of both hosiery and underwear, sweaters sharing in the activity.

The bulk of the winter underwear remains to be bought. Three southern mills making low price union suits and separate garments, which began booking business as long ago as November, received additional orders and are understood to have sold a large part of their production. With these mills the year started well. Some of the manufacturers of high grade distinctive lines also had an auspicious beginning in January, having opened their lines in December in utter defiance of the policy of some interests to wait for the formal opening, which was staged for January 9. It did not materialize. No one in the primary market on that date could have detected anything out of the ordinary in winter underwear transactions. In fact, a leading North Carolina mill, it was stated in the New York office of the mill, was even then on the market. Prices had been named but, it appears, were withdrawn or held for possible revision.

It had come to the ears of some persons in the trade that a few underwear manufacturers had reduced prices from the very low initial figures. Several followed; most of the mills stood pat. The cuts were uncalled for and hurt more than they helped. Jobbers were waiting to see how far manufacturers might be willing to play the game. What little demoralization ensued was short lived, for several manufacturers made it known that, while they were opposed to any recessions, they would cut so long as others did; that they would stay for a finish fight. This was sufficiently alarming to the cutters to bring them to a realization of what they had started, and the mischief was halted.

There would appear to be no good reason for sacrificing heavy weight cotton underwear for stimulating operations by distributors, for in the first place it is regarded in the trade that cotton will hold about where it was in mid-January, the feeling at that time being that advances were more likely than declines. In the second place, deferred buying will result in somewhat curtailed production, and in the opinion of the executive of an important mill in the Mohawk Valley there really is a shortage already. He says that if all the underwear for next winter were bought by the end of February and every mill making staples operated to capacity thenceforth with a single shift it would be impossible to complete deliveries to jobbers by September. It was pointed out that, notwithstanding the mild winter, there can be no carryover stock from which to draw; that few if any distributors bought last year beyond requirements and that by the first of the year there had been a general clearing away of stocks. That this is true is indicated by scattering duplicate small-quantity orders, strictly spot delivery being specified.

The question was put to a well known mill whether, in the event jobbers deferred commitments or bought ultra-conservatively, mills would not accumulate stocks in anticipation of a shortage late in the year, when high prices for spot might be obtainable. It was his positive declaration that they would not do so—that few have the capital necessary for carrying stocks for dealers and that banks would not be willing to finance them. Banks, he said, will be disposed to grant loans to distributors for acquiring stock, but not to mills for carrying it no one knows how long. It was pointed out that to obtain financial assistance

those applying for it must not only show a clean inventory, but also must establish the fact of their confidence in the market. While that were lacking there would be no disposition to put money into stocks in mills for distributors to hammer later.

Operations in fleeced underwear appear to be hedged to a greater extent than transactions in cotton ribbed goods, more particularly the low end. Fleeces have undergone no material price reduction, while in the ribbed what could not be lopped off in mere price has been compensated for in lighter weights, a difference of say 50 cents a dozen as between 16 and 14 pound suits. While the clamor for lower prices goes on, some interests seem to believe, the lighter weights will be acceptable generally. One of the Utica, N. Y., mills, however, has sold heavily of its standard 16 pound suit at $11. This is said to be the price of a southern mill, which, however, pays freight to destination anywhere and allows a trade discount. There still is much of the go-as-you-please spirit manifest in the winter underwear market in contrast with the uniformity prior to the war disturbance.

The January hosiery market was a subject for study. Cheap cotton goods could be sold at only very low prices, and it is stated mills in North Carolina have been fairly well employed, but not getting value for their product. Some few manufacturers of low end hosiery, while in need of business and not operating to capacity, are adding machinery for reducing cost through a diminished overhead. "Among us manufacturers of hosiery that cannot be sold for what it is worth," said the executive of an important mill in the South, "there is a condition working very rapidly toward the survival of the fittest. This selling of mill product merely for saving machinery from rust cannot long go on. Some will drop out voluntarily, in my judgment; others will be forced out, and until there has been a weeding out of the weaker or there has been a tremendous increase in our export business we cannot get living prices."

The branded half hose of at least two nationally known mills is being sold in the Woolworth stores at 10 cents a pair, as prior to the war. The socks certainly cannot be sold by mills at even a smattering profit for less than one dollar a dozen, and the unbranded lines from several mills are selling to jobbers at $1.10 and more. Obviously when the public sees the five-and-ten stores selling at prewar prices there is wonder why there should be prices on any like commodity 25 to 50 per cent above those of the period of undisturbed peace.

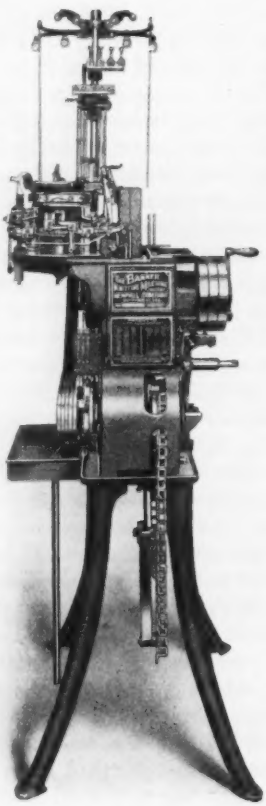
It need not be surprising if women's cotton stockings go on the five-and-ten counters at prewar prices for a long run, for a sale of a very large quantity, at well under 90 cents a dozen for full seamless, is reported to have been made. The name of the buyer is not disclosed, but he is understood to have bought for a large popular-price establishment operating a chain of stores.

Stockings to sell at retail for a dime are the chief hosiery staple commanding attention, and manufacturers are not profiting by this movement of goods. It is felt that this is not to be a good year for staples, except at former popular prices. The Woolworth and like stores are moving staples in enormous quantity, indicating a demand from a large part of the consuming public for price rather than vogue. But there is a big buying element that is apparently not taking its quota of staples—the farmer—as shown in the heavy decline last year of the business of the catalog houses, which ordinarily draw heavily from the agricultural sections, while the Woolworth stores' increase by more than four per cent over 1920 shows the friendly attitude of a large part of the urban population toward staples, which are about all among the manufactured commodities available to the consumer at the prices of eight years ago.

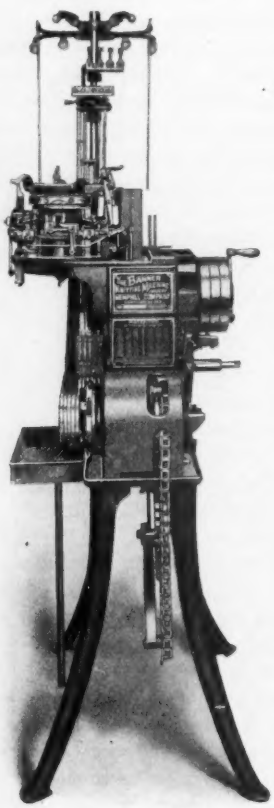
"This is to be a fancy year in hosiery," say operators in the primary market, and it appears that full provision has been or is being made for conforming to that notion, and heathers are and will continue to be the rage. Of these there are more varieties than Heinz, of pickle fame, ever dreamed of, and in their favor is the fact that there is practically no limitation to the fabric constituency, riot of color or jumble of combination in shade. The more a heather stocking resembles a scrambled fabric, within certain limitations of reason, the quicker is it taken up by the trade and the more difficult its reproduction. There are heathers of all cotton, of cotton in mixture, silk and mercerized, artificial silk and almost any kind of yarn, and all-wool. In the trade it is common now to refer to the latter heathers as just "wool" as in contradistinction with mixtures. There are heathers for winter and for summer, and medium weights for between seasons, so that it appears the manufacturer and dyer will be able to meet the requirements for whatever taste. And the trade is buying.

As is generally known, jobbers have bought heavily of heathers for the winter of 1922-23. They didn't have enough this winter, and a few retailers still are buying for the current season, when they can find them. A Pennsylvania mill, which has sold in large volume for next winter, could have disposed of 20,000 dozens more for the present season. One of the small jobbers in New York cancelled a heather order on the ground delivery was three days late. He wanted them for early December. Since demand from retailers continues, he has reinstated the order, and recalled the goods, which had been returned, without permission of the manufacturer. But, having finally put the goods in stock a month late, he came back for a rebate from the order price on the ground the stockings were of lighter weight than had been contracted for. This proves to have been not the case.

The jobber who cannot find an excuse for canceling an order or rejecting merchandise is coming to be looked on with disdain by most wholesalers. There is pending in the courts of New York a controversy over an order which a manufacturer cancelled in 1917 after the mill had been commandeered by the government and an officer was put in charge to see to it that nothing be made for civilian use. The jobber brought suit to recover the difference between the price at which his order was placed in the Fall of 1916 and the price at which like goods sold in February, 1919, when jobbers were canceling more freely than they since have bought. As the mill could not deliver in 1917, for the reason stated, the jobber bought a lot from stock—goods which were in process at the time the mill was taken over by the government. The goods were shipped out immediately, and after they had been delivered to the carrying company the shipper received a cancellation from this jobber. He could not be persuaded to accept delivery, but as prices then were slowly advancing, the mill had no difficulty in disposing of them at destination. This jobber



New Model
BANNER
Split-Foot
Machines



Write us for
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HEMPHILL COMPANY

Pawtucket, Rhode Island.

Southern Office and Show Rooms: 912-913 James Bldg., Chattanooga, Tenn.
Philadelphia Office and Show Rooms: Rooms 208, 209, 210 Colonial Trust Company Bldg., 13th and Market Sts., Philadelphia, Pa.

assumed the right to cancel, and now has engaged the mill in litigation for canceling—doing what it was virtually compelled by the government to do. There are a great many like him. Every seller right now ought to absolutely safeguard himself against loss by cancellation, even in the face of a steady or rising market.

While some retailers were buying silk hosiery during the brisker holiday season a few were submitting cancellations or calling for deferred deliveries. They didn't want a single dozen for which they could not see an immediate outlet. These dealers are burning their bridges, for there is to be a curtailed production of silk hosiery. A number of manufacturers have stated they will buy no silk until dealers buy silk hosiery and come to their senses in the matter of treating an order as it ordinarily is intended to be treated. Not only will output be curtailed; manufacturers here and there are withdrawing their lines, to be offered later at prices based on current raw silk value. Mills with silk in stock are declining to sell their product at prices which recently prevailed, and dealers refuse to pay advances. The latter, while holding for prices based on reinstatement value when the market declines, seldom will pay them, on that basis, except under protest, when a rise has taken place. They seldom neglect an opportunity to sell on replacement value during a period of advances, and as seldom do so on a decline. As a jobber well said, a lot of retailers are due for a jolt, and it looks as though some of them will get it in silk hosiery between now and summer, for it appears there is to be no great abundance of the more desirable types of silk stockings, particularly if raw silk continues steady at existing prices, and assuredly not if Japanese interests boost prices further.

Logically, there should be a very great increase this year over 1921 in production of full fashioned hosiery, for approximately 400 leggers and a corresponding number of footers, of both domestic and foreign build, were installed last year. Practically all of these will be in operation within two months, most of them being operated at this time. To the production of the new machines must be added that of sixteen mills which were idle last year for an average of seven months. Few of these mills, however, are getting off capacity production, as the operatives who sullenly gave up their strike for the closed shop and returned to work at wartime wages, which are to be a subject of arbiration, are lagging and continually promoting friction with non-union operatives. This condition is confined more particularly to Philadelphia.

There is a scarcity of silk hosiery for preferred deliveries, and among buyers in the market are representatives of several mills which have sold up their production and have yet to satisfy some of their customers. Of silks there will be no early output commensurate with demand. Goods which were cancelled were speedily sold at slightly better prices, so that there have been instances in which sellers profited by buyers repudiating their obligations. Dealers who cancelled at prices under reinstatement value are to be shunned as chronic offenders.

Standard silk boot full fashioned hosiery bought last year for the current delivery period will go into distribution at prices quite advantageous to jobbers, for prices now are up by about two dollars a dozen. The present outlook is for still further increases, unless the silk market has reached the year's price peak. More silk is being consumed in the manufacture of hosiery than in any previous year, much of it being used in mixture with wool and mercerized yarns for heathers, and the consumption of silk for other lines of manufacture also is increasing. In the circumstances silk seems more likely to hold for the present than suffer even a slight decline, yet manufacturers are reluctant to contract for the future, and with this feeling existing generally it must be obvious that the turning out of silk stockings will be cautiously proceeded with.

Seamless silks are suffering to a greater extent than full fashioned from the effects of the rising raw silk market, this applying to ladies' stockings. The scarcity last year of full fashioned whetted the appetite for them, and their use is on the increase, notwithstanding the three-seaming of the seamless-made. Full fashioned manufacturers are well organized and are in a strong position for advancing their mutual interests.

For some weeks following the holidays there was weakness in the market for seamless silk half hose, and one of the strong southern lines recently was withdrawn when the price was $5 a dozen, and put back two weeks later at $5.50. One establishment offered a limited quantity of silk socks at $4.25 a dozen, which at the time did not represent replacement value. A sock of silk in combination with artificial silk is moving at $4.75.

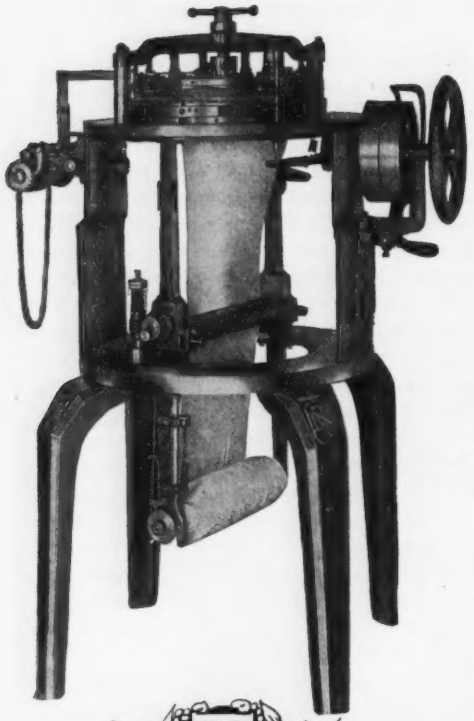
Hosiery made from combed yarns appears to be in better demand. One Pennsylvania mill is sold to April of combed socks with double sole and high spliced heel, at $1.85. Not all mills making combed socks, however, are so favorably situated as to business. One would have been 20,000 short of requirements to date but for the fact there was double shift operation.

It is a peculiarity of the hosiery market that of mill agents occupying offices in the same building and handling identical lines, a few have sold up for large mills, while others cannot keep smaller mills busy. Agents having the active support and cooperation of their mills have been booking the larger business. It is a mistake on the part of a manufacturer to assume that all the agent requires is the line. To get the best results the mill must get right back of the agent. It is observed that agents representing well established mills have little difficulty in getting satisfactory business. Frequently when a buyer is negotiating for heathers he will inquire the standing of the mill; he will want to know how long it has been making such lines. Buyers have declined to take attractive heather lines from mills but recently engaged in their production, while asking no questions when assured the goods are from a manufacturer who has gone through the experimental period.

There was much complaint last year of the cross-dyeing of a number of heather lines, and dyehouse laboratories have been engaged for weeks on experiments for improvement and on innovations. A lot of heathers which went through last year would not pass muster this year, and it seems a certainty that some that will come out will spell a loss for those who introduced them.

The progress being made by heathers and mixtures raises a question as to drop stitch and fancies in ladies' mercerized for this year. There recently came on the market a stocking of very fine count mercerized in combination with silk, to go to jobbers around $15. It is of two colors, practically a two-tone effect, and quite fetching. It should prove a good substitute for all-silk.

Ladies' mercerized staples are draggy, commonplace



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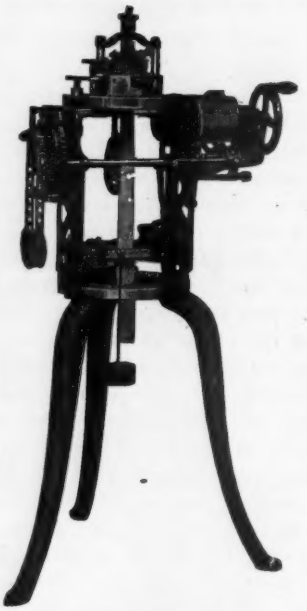

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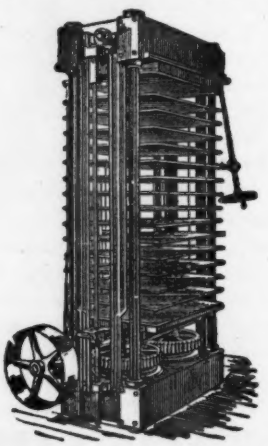

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lines being offered as low as $2.50 a dozen by at least two establishments. A branded line, 240 needles, is selling to jobbers at $3.60, and a Philadelphia mill has gotten $3.37½ for 220 needle. Mercerized half hose has been sold recently at as much as $3 a dozen for goods bearing mill brand, and as low as $1.85 for single sole. Then there is a mercerized with combed top, also at $1.85, and another at $1.77½, both to compete with all-combed double sole socks as a quarter-a-pair retailer.

While not a great deal can be said of misses' ribs of regular length, a recent sale of combed, 300 needles, was made at $1.85, and mercerized at better than $3.15 a dozen. The coarse cotton, assumed to weigh 28 ounces on size 9, are priced around 95 cents on size 7. Ribs in full length will doubtless be bought sparingly by dealers for summer, as by that time the roll top in three-quarter and seven-eighths lengths will be in its heyday.

There is in the making a strong hosiery market for the more desirable lines and a draggy one for staples, judging from the present outlook.

Sweaters for fall have proved disappointing to manufacturers. Jobbers have bought very few of the outer garments, and wool is going higher, with the result that early buyers will enjoy an advantage in price. Values are a trifle higher than a year ago. Dealers are showing a really keen interest in sweaters for summer, and mills making such garments should be steadily engaged from now to the end of the season.

Several leading manufacturers of heavy weight sweaters favor suspension of production pending a show of sincerity on the part of jobbers. They will not make for stock, owing to high cost of production, and there always is anxiety as to the extent to which novelties will be offered. At this writing sweaters are the dullest of the three major divisions of knitted goods.

The Open Price Plan for Hosiery.

Installation of the open price plan for hosiery was finally decided on as part of the service for members of the National Association of Hosiery and Underwear Manufacturers, at a meeting of the officers, directors and members of the advisory board in New York on January 16. This action followed the votes of approval recently recorded at meetings of the southwestern and southeastern divisions of the Association, after the plan had been fully outlined by John Nash McCullaugh, consulting industrial manager of the Association. Very soon after the plan is in operation for hosiery, it will be extended to the cotton underwear industry, many of the Pennsylvania manufacturers being members of the Association. Mr. McCullaugh explained that exchange of prices, among members, would be conducted along lines which would not be in conflict with the recent decision of the United States Supreme Court in the celebrated hardwood lumber case.

A recent incident showing the desirability of an exchange of prices actually quoted or at which goods had been sold was brought to the attention of the meeting by a member. In this instance two manufacturers of a line of underwear were quoting $4.37½. A buyer, when quoted by one of the manufacturers, represented that the other had named $4.25. The buyer bought from the mill naming the lower quotation. A few days later the manufacturers met by chance, and the one who had made the sale said to the other that he had booked an order (stating the number of cases) from a jobber, naming the city in which the dealer was operating. "You took that order from me; this jobber had come to me and gotten my price and left me with the impression that he would place the order with our mill. What price did you get?" was asked by the manufacturer who did not receive the order.

"I sold at your price, $4.25 a dozen," the manufacturer replied.

"That is not my price," the other manufacturer said; "I am asking $4.37½."

Then it dawned on the two manufacturers that the buyer had played one against the other, obtaining an advantage of 12½ cents a dozen and causing one manufacturer to distrust the other. It was pointed out that had the two manufacturers been cooperating in the open price plan the buyer would not have been able to beat down the price of either; or, had he done so through misrepresentation, that the jobber selling under his recorded price would have suffered exposure in his organization.

Through this incident, it was stated, there would be very shortly a substantial acquisition to the Association's membership, if for no other reason, to benefit by cooperation in the open price plan.

By unanimous vote of the meeting of the executive board, the proposal to remove the executive office of the Association from Philadelphia to New York was confirmed, the annual conventions and exhibitions, however, to be held in Philadelphia as always in the past.

Hughes L. Siever, representing the Borne, Scrysmer Company, of New York City, has recently begun another trip through the southern section, introducing and demonstrating Breton Minerol F, a product of the Borne, Scrymser Company that is especially designed for finishing yarn and fabrics made of cotton, and by the use of which, it is claimed, all the luster natural to the fiber and brightness of the bleach or color is retained and enhanced. The manufacturers state that this product is so made that it does not have the usual objection to substances of animal or vegetable oils, that is the tendency to turn rancid in use and storage.

Another product which Mr. Siever is explaining and demonstrating to the mills is known as Breton Minerol S. and is a product designed particularly for use in connection with the boiling out of cotton goods, either in the open or in the kier, where its high solvent powers are said to give an advantage without resorting to a dangerous material which might cause fires or explosion, due to giving off explosive gas. At the same time, it is stated, this material is so made that it really removes the foreign matter from the cotton and also from the water, coagulating it into a form easily removed by rinsing.

Joseph M. Merrow, president of the Merrow Machine Company, Hartford, Conn., recently returned from Europe, where he spent three months in a business and pleasure trip. This was the eighth trip Mr. Merrow has made abroad. Upon his return, a few weeks ago, he was the guest at dinner of a group of Hartford manufacturers, and outlined for his industrial associates the conditions and problems of the countries which he visited, including England, France and Italy.

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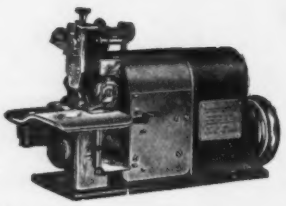

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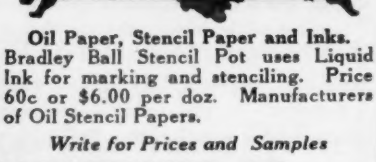

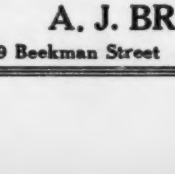

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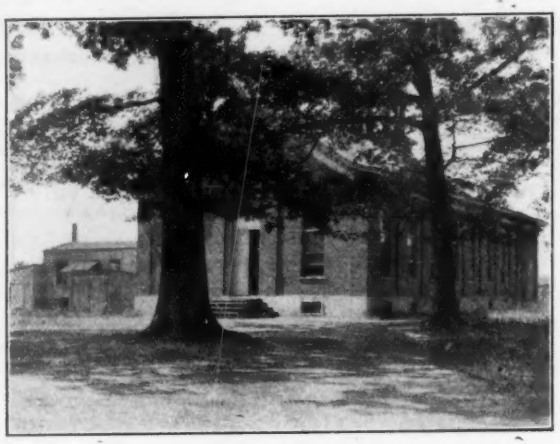
Among the Knitting Mills.

The majority of the stock of the Charlotte Knitting Company, Charlotte, N. C., has been purchased by Charles L. Okey and B. F. Crawford, of Chicago, and J. H. McEwen. Mr. Okey succeeds R. J. Walker as president, and Mr. McEwen, who has been secretary-treasurer and active manager, will continue in that capacity. Messrs. Okey and Crawford are connected with the firm of Okey & Crawford, Chicago and New York, selling agents for hosiery and underwear, and in the future will sell the entire output of the Charlotte mill to the jobbing trade exclusively. Plans of the new management include the immediate increase of the output of the mill, adding new machinery



THE BARNES KNITTING CO., CEDARTOWN, GA. JOHN H. BARNES, PRESIDENT AND TREASURER.

for the manufacture of ladies' silk and heather hosiery. At present the mill has a monthly production of 10,000 dozen pairs of hosiery. All machines now in operation are on silk and fiber silk plated goods.

The Trenton (N. J.) Hosiery Mills, recently organized with a capital of $100,000, has acquired a building and will establish a plant for the manufacture of silk hosiery. Machinery and operating equipment comprising about 100 knitting machines will be installed for an initial production of about 350 dozen pairs per day. The company is headed by Arthur R. Mandeville, John P. Parks and John P. Quinlan. The latter will act as vice-president and selling agent, with offices at 346 Broadway, New York City.

H. A. Sacks, J. A. Sacks and Jacob Kugleman have recently organized the Arteraft Silk Hosiery Mills, Philadelphia, Pa., with a capitalization of $100,000. They will make women's full fashioned hosiery, and thirteen 18-section full fashion machines will form the initial installation of the new plant, which will be located at Erie Avenue and Amber Street.

The Hoover Hosiery Company, Concord, N. C., has moved into its new brick building, just completed.

It is stated that thirty knitting machines will be installed at the Richmond Hosiery Mills plant at Etowah, Tenn., and that a dyeing and finishing department will be established later.

The Perkins Hosiery Mills and the Massey Hosiery Mills, at Columbus, Ga., have been consolidated under the former name. A connection will be made between the two plants which will form them into one unit 800 feet long.

The B. & W. Knitting Mills, Knoxville, Tenn., have obtained manufacturing quarters and will begin the manufacture of women's silk hosiery. Roy M. Biddle is president and Herbert P. Whittle is secretary and treasurer of the new company.

The Bur-Bola Hosiery Mills, at Burlington, N. C., has begun operation. The mill operates 50 latch needle, 3½-inch machines making 200-needle goods. There are 10 loopers and 8 sewing machines. C. G. Boland is president and R. D. Maser is superintendent.

Fred H. Wagner, of the Telford Bank, Telford, Tenn., plans to invest several thousand dollars in the establishment of a hosiery knitting mill at that place, it is reported.

The Juniata Hosiery Mills, Mifflintown, Pa., are completing the erection of a new dye house at their plant.

Bottum & Torrance Co., Bennington, Vermont, are installing twelve new hosiery knitting machines and will make a further similar addition later; also two welters, three loopers and four Merrow machines for clocking. F. L. Bottum is president, H. E. Pritchard, treasurer, and Jos. L. Gadbois, superintendent.

At the annual meeting of stockholders and directors of the Walker County Hosiery Mills, LaFayette, Ga., recently, J. E. Patton was elected president and treasurer of the company, succeeding the late J. P. Shattuck. J. M. Patton was made a member of the board of directors.

On January 9th the knitting mills in the Utica (N. Y.) district increased the number of working hours from an average of 50 hours per week to 54 hours per week, which is the maximum number of weekly working hours allowed by law in the state of New York. At the same time it was decided to decrease all piece and day operatives' wages 12½ per cent. It is stated that the mills were in a measure successful in these efforts, inasmuch as the help, many of whom were unemployed for seven months in 1921, accepted the 12½ per cent wage reduction, but refused to work 54 hours a week, and the mills complied with the wishes of the operatives in this respect.

The Paducah Hosiery Mills, Paducah, Kentucky, manufacturers of misses' ribbed hosiery, have recently erected their own dyehouse. The new dyehouse has been completely equipped with "Hurricane" machinery, built by the Philadelphia Drying Machinery Company, and the equipment includes a rotary-circulating dyeing machine for sulphur black and paddle dyeing machines for colors and bleach work. For singeing the hosiery, a "Hurricane" automatic singeing machine of the Hagar type has been installed.

The Yale Knitting Mills, Malden, Mass., manufacturers of knitted underwear and other knit products, are planning for the construction of an addition to their plant.

The Perkiomen Knitting Mills, East Greenville, Pa., underwear products, have perfected plans for the enlargement of their mills to double the present yearly output. Additional machinery and operating equipment will be installed for this purpose.

Fire recently damaged the machinery and stock of the Broadway Knitting Mills, New York City.

The Ankle Knitting Co., Hawley, Pa., manufacturer of knit goods specialties, has leased a local plant and is planning for the installation of operating equipment. Immediately following the alteration work the plant will be placed in operation.

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has construction under way on its new addition at Lynbrook, L. I. The structure will be three-story, 40x106 feet.

Daniel E. Reifsynder, Pottstown, Pa., has leased a factory building for the manufacture of knit goods products. The new plant will represent Spring City interests.

A petition in bankruptcy has been filed against the Tremont Knitting Mills, 910 Courtlandt Avenue, New York City.

The Morris Knitting Mills, 1329 Myrtle Avenue, Brooklyn, N. Y., is taking bids for the construction of its proposed three-story mill, estimated to cost about $40,000.

Fire recently damaged the machinery and stock at the works of the Berlin Knitting Mills, 119 Cannon Street, New York City.

A Freight Classification Concession.

After more than two years of persistently sticking at it, a committee of the National Association of Hosiery and Underwear Manufacturers, of which Gustav Oberlaender, Berkshire Knitting Mills, Reading, Pa., is chairman, has procured a cotton yarn freight rate concession on shipments originating in the South. Henry M. Jenkin, traffic manager for large eastern Pennsylvania interests, conducted the long fight for the committee, of which Charles J. Esterly, also of the Berkshire, is secretary. In a letter to Mr. Esterly advising the committee of the concession on less than carlot shipments, Mr. Jenkin says:

"Mr. J. E. Crosland, agent for lines in Southern Classification Territory, (railroads south of the Mason & Dixon Line) has, effective February 10th, 1922, in Supplement 13 to Consolidated Classification No. 2, placed knitting cotton yarn on forms weighing each over four ounces, in bales or boxes, or on wrapped beams or in wrapped rolls, loose or in crates, in 5th class rating, on any quantity.

"This rating practically permits both carload and less than carload shipments of the above commodity to move out of Southern Classification Territory (points south of the Mason & Dixon Line) to points in Official and Western Classification Territory, regardless of weights, on a carload rate basis.

"To be more explicit, a single case of the above commodity, from Charleston, S. C., to Philadelphia, Pa., weighing approximately 400 lbs., would be afforded a carload rating. The same rate would apply to a similar consignment of 40,000 lbs.

"This decrease in the rating is really more than we expected. The fact that the Southern Classification Committee has so liberally considered this matter should strengthen our position to obtain a similar reduction from Class R-25 in Official Classification Territory, through the Interstate Commerce Commission, for the reason that the tonnage in Official Classification Territory (points north of the Mason & Dixon Line and east of the Mississippi River) is considerably greater than in Southern Classification Territory."

The Irving National Bank calendar for 1922 is arranged in the usual style adopted by that institution, and gives a summary of useful tax information for the business office. Also, dates on which Federal taxes and the New York City taxes and state taxes in New York and New Jersey are due appear in squares, and Sundays and bank and business holidays are in color.

The Yarn Market.

After losing a little ground during November and early December, prices on the Philadelphia cotton yarn market took a new lease on life and started upward again, the turn of the year finding the market considerably stronger insofar as prices were concerned. Late January saw prices on a higher plane than that reported here last month, and with the idea of further ascension still obtaining.

The bottom of this last slump's toboggan seems to have been reached about December 19 or 20, at which time quotations started back up, with the result that on January 15, the list in general was on a relatively higher level than it was a month before. Southern two-ply skeins, 10s, for an instance, had receovered two cents to a quotation of 31 cents; 34 cents was asked for 20s in the same yarns against 32½ cents on December 16; a gain of a nickel was made by 60 southern two-ply combed peeler skeins from a December quotation of a dollar; southern frame spun carded yarns on cones 30s, showed a recovery of three cents, calling for a price of 39 cents on the January date; and so on.

It will be noted that in the examples cited in the foregoing paragraph, southern yarns only are quoted as showing an increase, and this develops a situation that occurred in this market during the past four weeks which, according to experienced factors, puts in an exceptionally rare appearance in yarn dealings. It is this: In spite of a declining raw cotton market, with the resultant expectations that yarns would follow the lead set by the staple, southern spinners held firm and in most instances lifted their quotations a bit. Furthermore, in addition to being contrary to practice and expectations, this action on the part of the southerners was diametrically opposite to the course pursued by the northern spinners under the same conditions. The northern section of the list, instead of showing the advances made by the other yarns, declined along with the cotton market, and northern mule spun combed peelers on cones showed a decrease of from two to three cents under the list published last month.

Several reasons are cited for the position that is being taken by the southern manufacturers. As has been pointed out in previous reports, these manufacturers are realizing that the prices which have been prevailing for yarns have been insufficient to even allow them to break even on their output, much less to make a profit, and this, together with a more thorough investigation of the actual manufacturing costs, have produced in them a determination to hold their product for a price that will return to them what was expended in manufacturing the yarns at least. This they are doing, and are taking advantage of every possible chance to raise prices up more nearly to a level corresponding to their manufacturing and distribution costs, with the result shown by the published list of spinners' quotations.

As to the evident disregard for the raw cotton quotations in this upward revision of yarn prices by spinners, an explanation offered by one prominent southerner is the fact that most spinners became committed to cotton last fall, when it was much nearer 20 cents than it is now. "We have stopped watching the quotations on the New York market," he explained, "but what we are trying to do is to get yarn prices to a point that will hold our losses of operation down as much as possible." Spinners' rising quotations do not represent an effort to get a margin of profit

out of production, he said, but merely to reduce the probable extent of their losses.

As far as actual business transacted was concerned, the month just gone was no exception to the rule, inasmuch as in this respect the market continued quiet. However, it was reported that in some instances spinners were getting some business and at prices more nearly corresponding with their own figures than was indicated in the published price lists. Buyers as a rule seemed indifferent to the action of the spinners, either in the belief that there is to be another decline or from the fact that they themselves are sufficiently provided with yarns to care for what business they are getting in their respective lines.

Quotations on the Philadelphia market on January 15 follow:

Southern Single Skeins.

4s to 8s	30½	10s	31 @31½
12s	32 @32½	14s	33
16s	33½ @34	20s	34 @34½
24s	36 @36½	26s	37 @37½
30s	38 @39		

Southern Single Warps.

8s	31	10s	31½
12s	32½	14s	33½
16s	34 @34½	20s	34 @34½
26s	37 @37½	30s	38 @39
40s	55		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 sack	28@29
8-2-4 tinged tubes	23@24
8-3-4 hard white warp-twist	27@28
8-3-4 hard twist waste	22@23

Southern Two-Ply Skeins.

8s	30	10s	31
12s	31½	14s	32½
16s	33	20s	33½ @34
24s	34½ @35	26s	35½ @36
30s	37 @38	40s	54 @55

Southern Two-Ply Warps.

8s	31	10s	32
12s	33	14s	34
16s	34½	20s	35
24s	36½	26s	36½ @37
30s	38 @39	40s	57 @58

Southern Two-Ply Combed Peeler Skeins and Warps.

8 to 16s	54	20s	55
24s	57	30s	65
40s	75 @80	50s	85 @90
60s	$1.00@$1.05	70s	$1.20@$1.25
80s	$1.35@$1.40		

Southern Frame Spun Carded Yarn on Cones.

8s	30½	10s	31
12s	31½	14s	32
16s	32½	18s	33½ @34
20s	34½	22s	35
24s	35½	26s	37½
30s	38 @39	40s	55 @56
30s double carded			47
30s tying-in			36½

Northern Mule Spun Carded Yarn Cones.

10s	36	12s	56½
14s	37	16s	38
18s	39	20s	40
24s	42	26s	44
30s	47	40s	58 @60

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	44	12s	45
14s	46	16s	47
18s	48	20s	49
22s	51	26s	58
28s	60	30s	64
36s	72	38s	73
40s	75		

The Kaumagraph Company announce that they have opened a new office in Charlotte, N. C. This is located at 219 Latta Arcade, 324-330 South Tryon Street. It will be in charge of Chas. H. Campbell. It is interesting to note that the Kaumagraph Company in the last year and a quarter has opened five branch offices. They are established in Boston, Philadelphia, Chicago, Charlotte and Hamilton, Ontario.,

---

Smith and Furbush Machine Company, Philadelphia, Pa., distributed to the trade a serviceable calendar for 1922, showing some of their felting, shoddy and waste machinery.

A New Color Card.

The new color card showing dyes for cotton, issued by the National Aniline & Chemical Company, Inc., marks a new departure in this character of service to customers. It embodies several features which are entirely novel and which cannot fail to be of the greatest possible assistance to users of dyes and which will be received with appreciation by all consuming industries.

In this card there has been produced a table of dyeings and tabulations explaining the fastness properties of each one of the dyes illustrated. These tabulations explain such conditions as fastness to washing, fastness to light, fastness to acid, fastness to alkali, fastness to hot pressing, hydrosulphite discharge properties, and instead of being simply indexed and indicated by numerals, the information is given in good plain language, so that it may be easily understood and utilized.

General directions for the use of these dyes for cotton are given, based on carefully tried out tests and proved experimentation, and in addition there has been grouped under several headings those dyes which are best adapted to certain purposes. For instance, on page 15 of this new card, a list is given comprising "dyes for best fastness to washing," and in this list will be found some 40 or more dyes that may be depended upon in connection with this test.

Under similar headings, are also collected lists of other dyes as of best fastness to light, best fastness to acid, best fastness to alkali, best fastness to hot pressing, dyes most suitable for discharge with hydrosulphite, dyes most suitable for dyeing in a cool or lukewarm bath, and finally, those which are recommended for combination shades and subsequent shading, as well as for machine dyeing.

In all, in this interesting color card, which is in effect a handy manual for the use of the dyer, no less than 105 dyes are shown, represented by 210 dyeings, two different strengths of each dye being given. The general make-up and typography of the card has been carefully considered, not only for its artistic qualities, but for its convenience as a means of ready reference, and there is no doubt that it will be regarded as one of the most up-to-date steps taken by the American dyestuff industry.

An interesting newcomer in the field of industrial house organs is the one which has just been started by the Anchor Post Iron Works, Garwood, N. J., entitled, "The Illustrated Anchor Post." This little magazine is to be issued monthly, it is announced in the first issue for January, 1922, "in the interest of better fences." The first issue contains an instructive article on the process of electric welding in the making of Anchor-weld railings and gates, and contains other information of interest in connection with fencing questions. It is also elaborately illustrated with views of various types of Anchor Post fences in use, the frontispiece of the January issue being a reproduction in full colors of an ornamental gate. The general theme of the first number is to lay emphasis upon the importance of having gates in factory and other use just as protective and durable as the fence itself, else the effectiveness of the latter is lowered.

ANILINE DYES
FOR ALL TRADES

We carry in stock a complete line of Aniline Dyes for all trades.

Sandoz Dyestuffs are manufactured at our various works.

SANDOZ CHEMICAL WORKS, INC.

SANDOZ

For samples and prices apply to our offices

238-240 Water St. NEW YORK — 36 Purchase St. BOSTON — 12 So. Front St. PHILADELPHIA

175 Market St., PATERSON

Southern Office:
Room 407, Commercial Bank Bldg., Charlotte, N. C.

SANDOZ CHEMICAL WORKS — BASLE SWITZERLAN

D'OLIER
ELECTRICALLY DRIVEN CENTRIFUGAL HYDRO-EXTRACTORS

Twenty years experience in Extractor work. Builders of first direct Motor Driven Machine. No excessive vibrations, center of gravity low. We also make under-driven type of machines. Our Engineering Department is at your service with its years of designing and building Centrifugal Extractors.

Write for Bulletins I-115, I-116, I-116-A, -B, -C

AIR COMPRESSORS — CENTRIFUGAL PUMPS

The United States and Cuban Allied Works Engineering Corporation

165 Broadway, New York

Works: Bradford, Pa. *Cable, "Idolwax," New York*

AUTO GYP
Process of Dyeing

The WASTEFULNESS OF BLEACHING

THE unnecessary waste of materials, time and money in bleaching can only be realized by the actual saving that can be effected by the adoption of the AUTOGYP Process of Dyeing.

When you can get better results without the bleaching, it's a pure waste to bleach. The AUTOGYP Process of Dyeing entirely eliminates bleaching with its attendant delays and uncertainties.

WHAT *AUTOGYP* SAVES

It saves boiling out in kiers, the disagreeable bleach with chloride of lime or other hypochlorites with their danger of weakening and tendering the fibre. It saves *4 to 17* HOURS TIME as it performs the complete operation to shade in three hours time.

It saves six separate steps or operations; saves 3½% of shrinkage; saves 25% of tensile strength; saves 50% of steam; saves 30% of labor; saves 90% of water—and it saves ALL the chemicals used in the chloride of lime method of bleaching.

AUTOGYP requires no special equipment or appliances, no special skill. It produces a better looking, better feeling fabric of perfectly level and evenly dyed shades of marvelous uniformity.

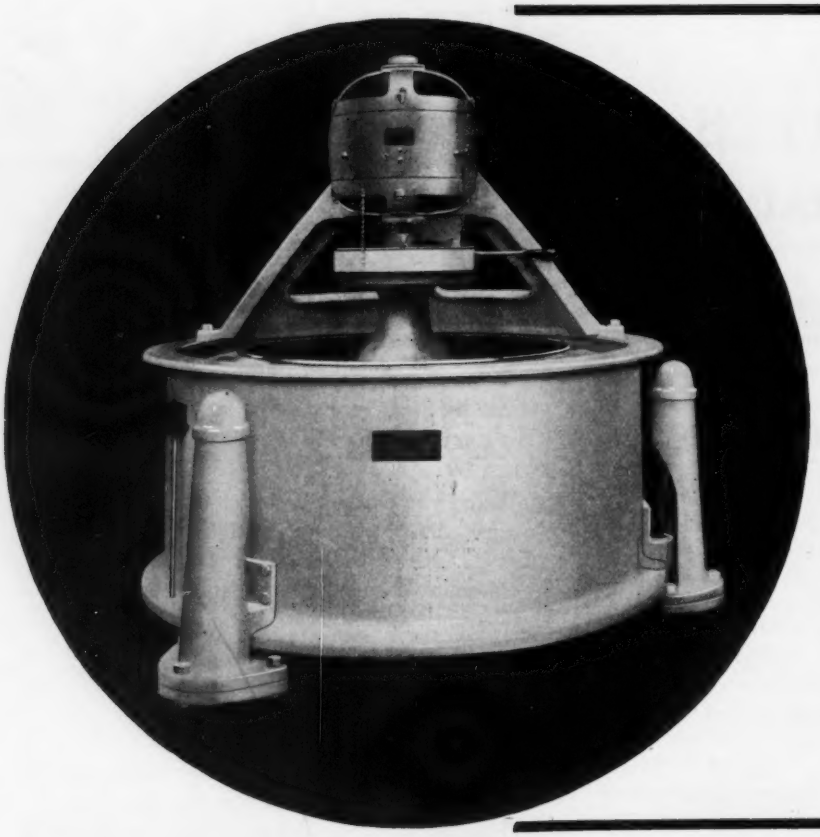
IN SHORT—any producer of dyed or bleached cotton goods can find a profitable use for AUTOGYP.

SAVE THIS WASTE!

Write for full information.

Surpass Chemical Co.,
Albany, N. Y.

SURPASS CHEMICAL CO. INC. FOR USE IN AUTOGYP PROCESS OF DYEING. AUTOGYP PATENTED IN U. S. A. SEP. 20, 1910 IN CANADA OCT. 10, 1910 ALBANY N.Y.



The Safety First Extractor

"Hercules-Electric"

SIZES 6" to 72"

EAST JERSEY PIPE CO.

PATERSON, N. J.

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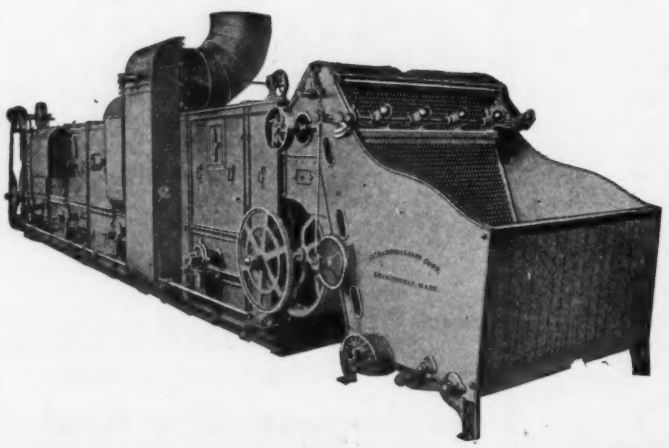
The Last Word in Dryer Efficiency



Sargent Dryers mark progress in Dryer Development comparable to that made in other fields of mechanical endeavor. They contain the latest and most up-to-date improvements. They are favored with a natural preference because they are designed on basic principles of air circulation, conveying and general drying apparatus construction, which have had the approval of discriminating mill men and drying engineers for many years.

In the Sargent Dryer these principles have been combined and refined, making a complete machine which is unexcelled.

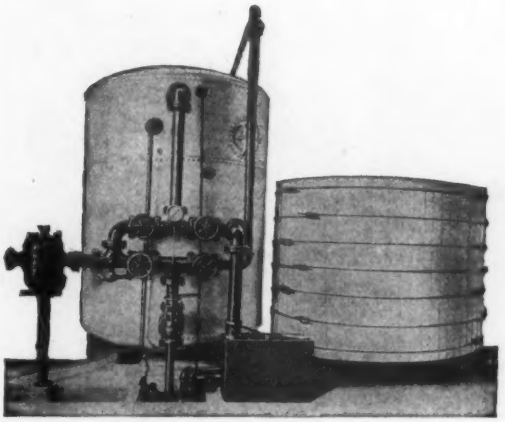
For drying cotton, linters, wool, hair, flax and other classes of raw material. Let us tell you more about the superior features of the SARGENT DRYER. Write today for catalog.

C. G. SARGENT'S SONS CORP., Graniteville, Mass.

FRED H. WHITE, Southern Agent, Charlotte, N. C.

SARGENT DRYERS

How a Mill Reduced Yarn Breakage to Practically Nothing



The name and address of this plant (with full details) will be given upon request.

A well-known mill in Millbury, Mass., manufacturing ticking had considerable trouble with the breakage of ends in their beaming machines.

Sets, composed of six individual warp chains of from 8,000 to 12,000 yards in length and weighing approximately 2,000 lbs., were run through at one time. The yarn was given a continuous run through a boiling 1% caustic soda solution followed by 2, 3 or 4 runs through the indigo vat, the hydrosulphite vat being the one used. The yarn was then washed and dried and sent along to the beaming room.

Due to the presence of lime salts in the water supply a precipitate was formed in the dye bath that deposited on the yarn, causing the individual threads to adhere, and when they were run over the beamers the yarn broke repeatedly necessitating frequent stopping of the machine to piece up the broken ends.

In November, 1919, they installed Permutit Water Softening equipment that removed all the hardness (lime and magnesia) from their water supply. A recent report stated:

> ".....Now we have no trouble at all and our light yarn which we make 12,000 yards long, beams in 3½ hours where before I have seen it run into the third day and in lots of cases it has run into two weeks. In other words, the beaming room, which was always spoken of as the 'narrow neck of the bottle,' and as such was unable to co-operate with the other departments of the mill, is now able to keep pace and has, without any additional equipment or labor, been able to take up the beaming of white yarn in addition to an increased production of blue yarn.
>
> "This improved beaming is naturally a very big item when the same yarn passes to the slasher tender and from there to the weaver. Furthermore, the saving in beaming room labor alone amounts to more than $6,000.00 anunally (6 girls at $20.00 per week), and the entire investment in Permutit equipment paid for itself in less than one year."

It will pay you to let us investigate your water supply. We make all analyses free of charge.
Write us today.

The Permutit Company
440 Fourth Ave. New York

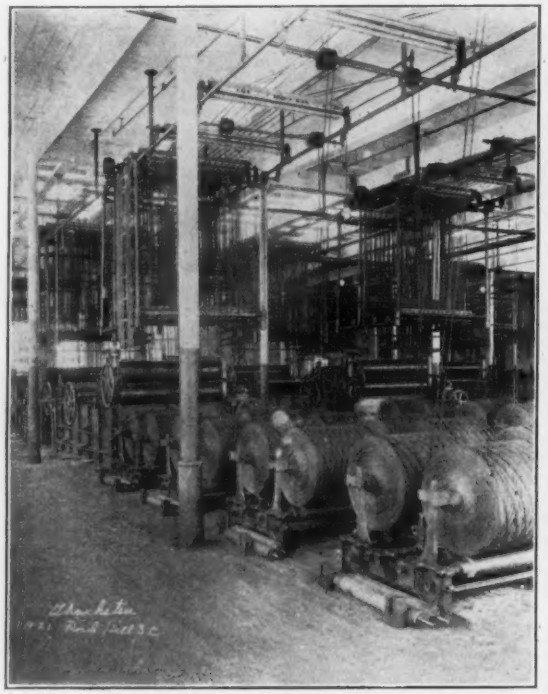
Filters *Water Softeners* *Special Apparatus*

We manufacture all types of equipment for treating water to render it soft, pure and correct for any purpose. We remove iron, manganese or any other impurity. Let us send you our valuable booklet.

Zeolite Water Softener Patent Sustained

The Federal Court at Buffalo (Hazel J.) on June 15, 1921, handed down a decision sustaining our broad patent covering Zeolite Water Softeners. According to this decision all Zeolite Water Softeners on the market not made by us are an infringement of this patent.

No need to borrow trouble—buy Permutit—it is the best anyway.



Continuous System Indigo Dyeing Equipment for Warps

In the equipment illustrated fifteen warps are led through a Two Compartment Boiling Out and Cooling Machine, through two Indigo Vats, and taken up by Dye House Ballers in one operation in an initial run.

In a second run the fifteen warps are led through two Indigo Vats, and are taken up by Dye House Ballers.

In a third or finishing run, five of these warps are led through a Two Compartment Wash Box operating in connection with the Dry Cans equipped with a five-unit Coiler.

The successful handling of warps through Continuous Dyeing Systems such as described is only possible through the use of Automatic Tension Controls and Regulators such as we build and use with our Dyeing Equipments.

For further particulars and prices, write or wire

Cocker Machine & Foundry Co.

Gastonia, N. C.

Builders of Warpers, Beamers, Warp Dyeing Machinery

WARPING MACHINERY

Linking Warpers—Linker Heads—Balling Warpers—Balling Attachments—Section Beam Warpers—Special Warpers.

WARP BEAMING MACHINERY

Long Chain Beamers—Short Chain Beamers—Warp Splitters—Special Beaming Machinery.

WARP DYEING MACHINERY

Boiling Out Boxes—Continuous Systems—Sizing Machines—Doubling and Splitting Systems—Sulphur Machines—Indigo Vats—Warp Coilers—Dye House Ballers—Hydro Sulphite Equipment—Warp Bleaching Equipment—Drying Cans.

DURABLE K-W UNIVERSALLY USED

KLAUDER - WELDON DYEING - BLEACHING- SCOURING MACHINERY

There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W Machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery by its accomplishments, has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the "world's best dyeing, bleaching and finishing machinery."

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

Write today for K-W Literature

THE KLAUDER-WELDON DYEING MACHINE CO.

Bethayres, Pa., U. S. A.

H. G. Mayer, Southern Agent,
Realty Bldg., Charlotte, N. C.

DRYING MACHINERY

for Textile Raw Stocks, Yarns and Fabrics of all kinds—built and sold with the knowledge that we, the largest producers of dryers, have a reputation to maintain which necessitates our giving matchless value in equipment and service for the purchase price.

Write for a catalogue.

PROCTOR & SCHWARTZ, Inc.

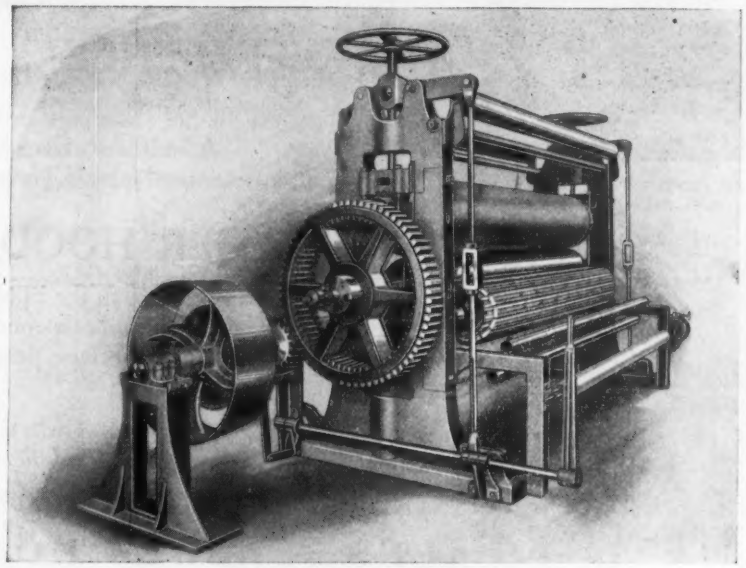
Formerly The Philadelphia Textile Mach'y Co.

PHILADELPHIA, PA.

"Proctor" DRYERS

The best dryers in the world for TEXTILES

BUTTERWORTH



CALENDER (Three Rolls)

EVERY Butterworth Finishing Machine is as good as every other--and as good as we can make it. We select superior materials, insist on precise interchangeability of parts and spend ceaseless care on assembly. This policy assures the absolute uniformity of our machines and the uniformity of their output in your mill.

H. W. BUTTERWORTH & SONS CO.

Established 1820

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MANGLES (all kinds)
CALENDERS (all kinds)
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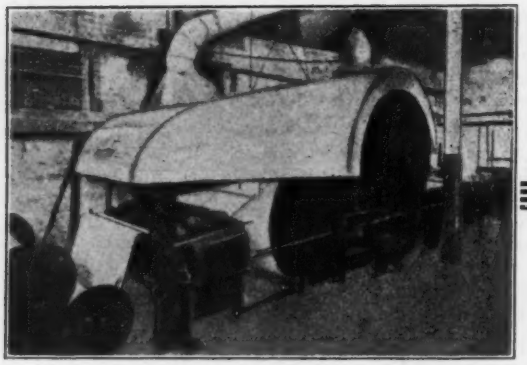
CELL DRYERS



SLASHER HOOD
Patented by R. O. Pickens

THE DIFFERENCE

There is all the Difference in the world between the old method of sizing and the modern method used after the installation of

PICKENS SLASHER HOODS

The thousands of yards of yarn passing through the Slasher Room each day can be handled much more efficiently and economically when PICKENS SLASHER HOODS are used because they are built on scientific principles.

Ten Southern Mills are now using them—Orders on our books for eight more—are YOU one of them?

A DEMONSTRATION WILL CONVINCE YOU.

R. O. PICKENS SLASHER HOOD CO.
Spartanburg, S. C.

FILTERS

PRESSURE GRAVITY

Especially designed to meet all requirements of Textile Mills.

Economical in upkeep.

Perfect satisfaction.

NORWOOD ENGINEERING CO.

Florence Mass., U. S. A.

CHAS. M. SETZER, Southern Representative,

Charlotte, N. C.

Our Old Friend

Dependability is again becoming quite up-to-date. And the continued constant demand for

Wyandotte Textile Soda
Wyandotte Concentrated Ash
Wyandotte Kier Boiling Special

marks with approval the uniformity and high quality which has always characterized these products.

You have use for at least one, perhaps all. May we not tell you more?

Order from your supply house.

The J. B. Ford Co., Sole Mnfrs.,
Wyandotte, Mich.

Starch

EFFICIENCY and ECONOMY are the watchwords today. Modern mill men who hold to this motto are discarding ordinary, imperfectly refined starches and selecting those special types best suited for their individual conditions.

Some desire increased weight, all need increased strength and better weaving qualities for the warp.

You know the result you seek.

We know and can provide the proper type of Starch.

400 MILL
500 MILL

EAGLE ★★★
EAGLE ★★
EAGLE ★
EAGLE ★★★★

FAMOUS N
C. P. SPECIAL

BLUE RIVER CRYSTAL

BLEACHING and FINISHING PLANTS have learned that "any old" STARCH or DEXTRINE will not do the work. To secure the proper "feel", the desired weight, the attractive finish, careful discrimination must be exercised in selecting.

STARCHES and DEXTRINES

We manufacture all approved varieties.

90 THIN BOILING CRYSTAL

162 GUM 163 GUM

DEXTRINES and BRITISH GUMS

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

AN OPEN LETTER ON COTTON WARP SIZING

Mr. Cotton Mill Executive:
At one of the recent sessions of the Weavers' Section of the Southern Textile Association in Greenville, S. C., one of the foremost topics discussed was—

"The importance of Slashing and its direct bearing on the major subsequent process—Weaving."

In New England also, cotton mill executives are giving the slashing department closer study than ever before, because cotton warp dressing, is one of the most important factors in any cotton weaving mill. This, because of its far-reaching effect in the subsequent processes of bleaching, dyeing and finishing.
During the past decade, our staff of experienced textile chemists have demonstrated the advantages of AMALOL and GLUANTINE in numerous representative cotton mills.
The mills we have gained then are still consistent users of AMALOL and GLUANTINE, because of their proven values.
Regardless of whether you are a user of beef tallow, rectified tallow or compounded gums, we are prepared to demonstrate, without obligation, the advantages of AMALOL and GLUANTINE.
Neither AMALOL nor GLUANTINE contain Magnesium Chloride.
Trial barrels cheerfully shipped on approval.

L. SONNEBORN SONS, INC.
Textile Products Division
262 Pearl Street, New York City

Established 1815

ARNOLD HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

Oldest in Years. Youngest in Spirit
Modern in Ideas. Progressive in Methods
"Service" Our Motto

All kinds of
Warp Dressings, Finishing Materials, Soaps, Soluble Oils, Etc.

Please Submit Your Problems to Us

DEVELOPENE

Makes Black Blacker

Manufactured Only by the

KALI MFG. CO.

1404-1410 North Front St.

PHILADELPHIA, PA.

Aqua Ammonia and Ammonia Salts

SULLOWAY MILLS HOSIERY

FRANKLIN, N.H.

A. W. SULLOWAY, TREASURER
R. W. SULLOWAY, ASST. TREASURER

Gentlemen:

Our Foxboro Liquid Recording Level Gauge is in operation and has been for some time giving perfect satisfaction.

Yours very truly,
SULLOWAY MILLS
H. F. DAVIS

Foxboro Textile Thermometers, Temperature Controllers, Pressure Gauges and Psychrometers are designed and built especially for:
Bleaching Kiers
Slashers
Dyeing Machines
Kettles
Tubs
Steaming Boxes
Drying Cans
Woolwashers
and for the Power Plant.

Tips for Textile Men

If you are interested in saving money, eliminating waste, and increasing the efficiency of your mill, it will pay you to know more about Foxboro quality instruments.

We have bulletins covering each of our instruments. Write to Dept. AS, for the one you need.

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Foxboro, Mass., U. S. A.

New York Chicago San Francisco Tulsa
Pittsburgh Philadelphia Birmingham

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TRADE MARK

118-108

THE GRASSELLI CHEMICAL CO.

DYESTUFF DEPARTMENT

117 HUDSON STREET, NEW YORK, N. Y.

SULPHUR BLACK GAC

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DIRECT CORDOVAN—DIRECT NAVY BLUE
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BICHROMATE OF SODA SODIUM SULPHIDE

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SOLE SELLING AGENTS FOR **ESSEX ANILINE WORKS, INC.,** BOSTON, MASS.

VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Staley's

Staley's Technical Staff is at the service of those manufacturers whose particular problems must be met by special quality starches. Our facilities for scientific research work are on a parity with our facilities for manufacturing—facilities which enable us to serve car-load customers promptly and efficiently.

Staley's Eclipse Thin Boiling Starch is "perfection" for sizing and finishing. It penetrates every fibre of the yarn—keeps it smooth and soft-feeling—gives it 10% to 15% greater strength—decreases shedding under looms and eliminates seconds.

Send for samples and prices.

A. E. STALEY MFG. CO.
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New England Office

A. E. Staley Mfg. Co., 88 Broad St., Boston, Mass.

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"BRETON"
MINEROL "F"

For
Plushes and Velvets
"It gives a clothy hand"

BORNE, SCRYMSER CO.
Established 1874
80 South Street, NEW YORK
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Works: Elizabethport, N. J.

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Manufacturing Chemists and Importers
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ALL FINISHING and SIZING PRODUCTS for COTTON

ANTISTAIN

MONOPOLE OIL
Reg. Trade Mark No. 70991

BLEACHING OIL
Kier boil Assistant

HYDROSULPHITE
For stripping and discharge printing

CREAM SOFTENERS

ALIZARINE ASSISTANTS

STANDARD DYES
OF
UNIFORM COLOR

FAST LIGHT YELLOW—
The Fastest Sunlight Yellow ever produced

KANAWHA CHROME BLACK E H K—
Soluble, a Jet Black suitable for vigoureux printing

KANAWHA CHROME FAST BLACK D—
A Jet Black fast to iron

KANAWHA CHROME BLUE BLACK 6 B—
Soluble and very suitable for vigoureux printing

Also Colors for Cotton, Silk, Wool, Leather, Paper, etc.

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Special attention is called to

CHLORANTINE COLORS

A complete line of fast to light and washing Direct Colors.
Suitable for Yarn, Raw Stock and Piece Goods.

SAMPLES AND QUOTATIONS ON APPLICATION

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Castor Oil and Castor Oil Products

Turkey Red Oil	Soluble Grease
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Flaxhorn—The Delicate Finish.

Works and Office: ATLANTIC, MASS.

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The Standard Pure, Soluble Soap Powder
In Use for 46 Years

INDIA ALKALI WORKS
BOSTON, MASS.

Let Us Supply You With

QUALITY

Roller Cloths
Clearer Cloths
Slasher Cloths

Our roller cloths are made of the right material, with just the right cushion and uniformity of surface to produce perfect results.

Clearer cloth is constructed of high grade material with thick strong nap that does not pull out and its uniform length is such that the rolls are cleared entirely of short fibre.

We can supply you with quality slasher cloth, having sufficient cushion, and porous to thoroughly force the sizing into the yarn.

Numbered among our many satisfied customers are cotton mills all over the South. Let us convince you. Send a trial order or write for prices.

PHILADELPHIA FELT COMPANY

FRANKFORD, PHILADELPHIA, PA.

Southern Sales Agent: M. C. Sanders, Greenville, S. C.

VERMONT SPOOL & BOBBIN CO.

OF

BURLINGTON, VERMONT.

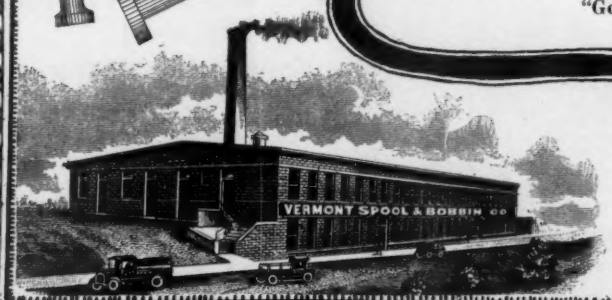
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.

Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.

Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.

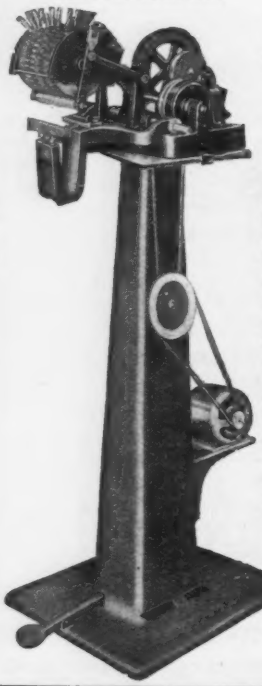
Give us a trial order and you will remain one of our satisfied customers. Write for prices.

"Good Goods at Fair Prices."



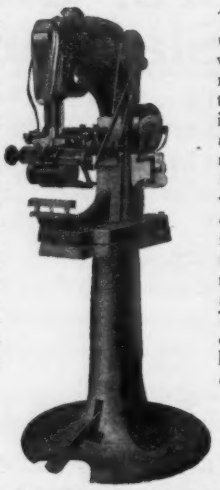
SPECIALISTS IN MARKING MACHINES

Carton Marker



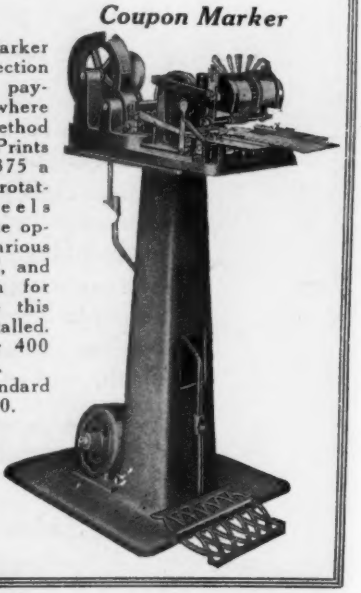
The Carton Marker is for printing the size, descriptive names or colors, style numbers, or lot numbers, on the carton or the label, giving an absolute uniform result on all your containers; eliminating the poor and blurry mark that is usually obtained by the use of hand stamps.
Over 500 of these equipments are in operation.
Is adapted for marking the set-up, folding or telescopic carton.
Price of standard equipment, $300.

Textile Marker



The Standard Textile Marker, designated at M-5 equipment, is for placing identification marks on pieces before going into the dye, bleach and finish, or any other operation in which the material requires marks for identification purposes, eliminating any possibility of error or short-measure. Gives you a true check on your yardage. Price for standard equipment $300.

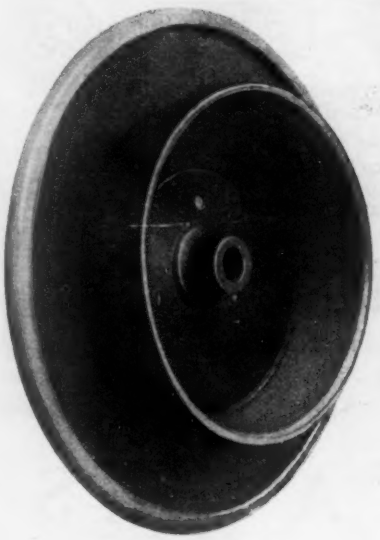
Coupon Marker



The Coupon Marker used in connection with piecework payroll systems, where the coupon method is operated. Prints at the rate of 375 a minute. Has rotating type wheels which enable the operator to set various numbers at will, and is the solution for marking where this system is installed. There are over 400 of these in use.
Price of standard equipment, $250.

MARKEM MACHINE CO.
232 Summer St., BOSTON, MASS.

ALL STEEL
Loom Beam Heads



Eliminate breakage and replacement.

Will not bend or spring in warping or in ordinary handling of beam.

Construction is such that your cast-iron head can be duplicated.

Ask for catalogue.

Patent Pending

Patent Pending

Mossberg Pressed Steel Corporation
Attleboro, Mass.

OUR SERVICE OFFERS

COTTON MILLS
A WIDE AND READY
MARKET
FOR THEIR USED TEXTILE MACHINERY & SUPPLIES

We are constantly designing and equipping mills for which we require high-class used machinery at fair cash prices. Send us a list of your offerings and start the way for a sure sale.

WE CAN ALSO FURNISH ADDITIONAL CAPITAL FOR TEXTILE ENTERPRISES

WATCH THIS SPACE
MONTHLY

WANTED

Breaker and Finisher Pickers 40" Rev. Flat Cards 12 x 6" Slubbers. In replying please send full description as to age, condition, etc.

TEXTILE SERVICE & EQUIPMENT CO.
CLEVELAND, OHIO

FIG. 2. LESTERSHIRE FIBRE HEAD SPOOL

"LESTERSHIRE" Vulcanized Fibre Head Spools

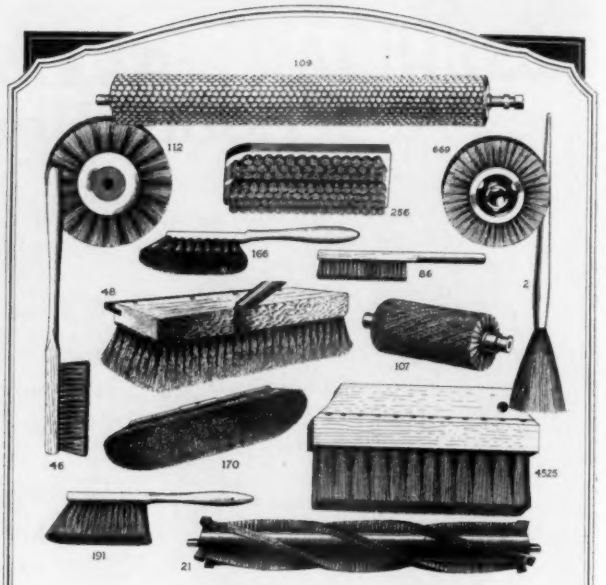
Lestershire Fibre Head Spooler and Twister Spools are the most economical Spools in use today. They will last longer, give better service and increase your production.

Write for details as to how these Spools will save you more than their original cost in the first six months' use.

Lestershire Spool & Manufacturing Co.

Johnson City, N. Y.

Spool heads that will not break, splinter nor roughen, with dogwood or fibre spindle bearings.



FACTS

Are Stubborn Realities

—and whether you know very much about the actual construction of brushes or not, you do know when a brush gives good service.

Every brush we make is sold under our A.B.C. Guarantee, meaning "Absolute Buying Confidence." It makes you the judge.

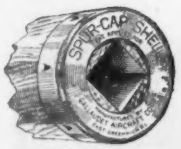
But we go down further than that. To make sure that you do get the right brush for every purpose, we maintain a service department, whose advice and assistance is at all times yours.

They are not employed to sell, but to serve, and the service is gratis. We hope you make good use of it during the year.

Yes, we do repairing, too.

Atlanta Brush Co.

Atlanta, Ga.



Pat. Applied for

SPUR-CAP SHELLS

Made to Stand the Hard Knocks

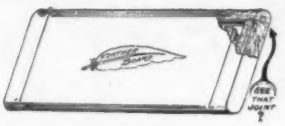
MANUFACTURED BY

GALLAUDET AIRCRAFT CORP'N.,

EAST GREENWICH, R. I.

FEATHERBOARD

The Master Cloth Reel



LIGHT AND STRONG. IMPROVES YOUR PUT UP.

DRAWN-IN only one time and change to any cloth when you weave with

"DUPLEX"

FLAT STEEL LOOM HARNESS

STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

511 Masonic Bldg., :: Greenville, S. C.

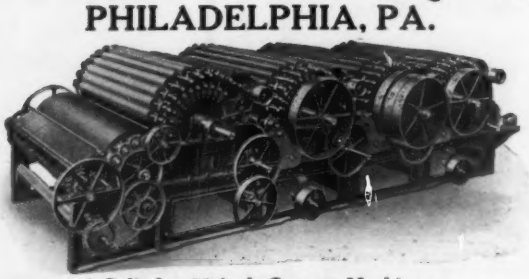
Hampton Smith, Southern Manager.

N. B.—We are the sole manufacturers of Nickle-Plated Drop Wires for every kind of loom.

SMITH & FURBUSH MACHINE CO.

PHILADELPHIA, PA.

A Garnett Machine of this size will reduce to fibre hard twisted thread waste without materially shortening the staple. We also build smaller machines for working soft washes.



4 Cylinder 30-inch Garnett Machine.

This Garnett is built on our own sectional unit frame construction and contains many improvements which we will be glad to explain.

Ask for Circular S-182.

AUTOMATIC STOP-MOTION DEVICE

for SPINNING and TWISTING

ECLIPSE

ITS simplicity and effectiveness is proved beyond doubt. The complete control of the spinning frame is placed in the hands of the operative. When an end breaks the stop-motion automatically covers the roving and instantly stops waste. It also operates when one or both bobbins are emptied, thus allowing all of the roving to run from bobbins. 90% saving is made in waste, not to speak of the labor saving and the prevention of mutilated bobbins.

At the Boston Textile Exposition the Eclipse Automatic Stop Motion was conceded to be one of the outstanding improvements of the industry.

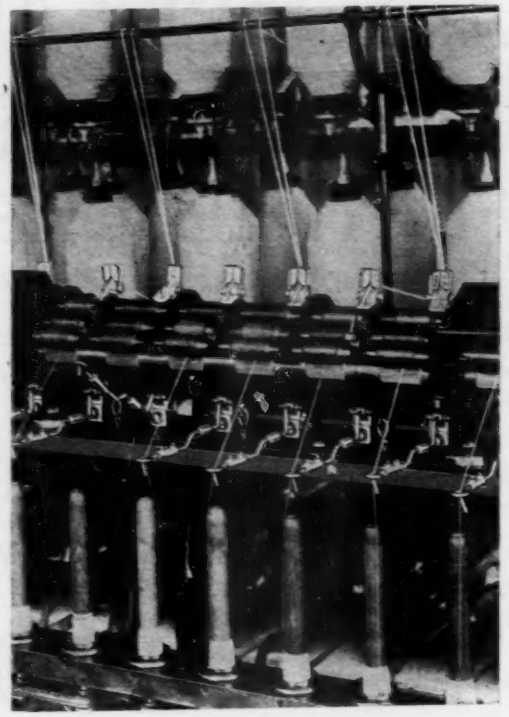
It decreases broken ends, and produces a more even yarn. There is 95% perfect condition of rolls and a 75% saving in top roll covering.

Actual operating conditions prove that this perfect device makes these worth-while savings and furthermore saves 40% of labor cost of spinning, increasing the efficiency of spinning frame operatives wonderfully.

Let us send you full information. A line today will bring it promptly.

ECLIPSE TEXTILE DEVICES, Inc.

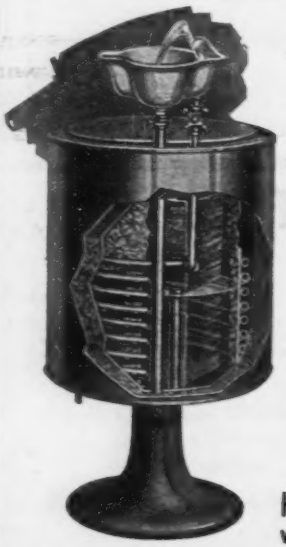
Elmira, N. Y.



Puritan CANTONMENT DRINKING FOUNTAINS

Sanitary and Practical

Practical drinking mound is formed by mechanical means. Interference is set up in stream which retards water at the apex of arc. This stream makes it impractical to drink from any other point, thus insuring perfect sanitation.



Approved by the U. S. Government. Now recognized by largest interests and schools in the country.

Puritan "Cantonment" Coolers are designed to connect with pressure lines and are so constructed that the drinking water does not come in direct contact with either the ice or ice water, but is circulated through brass coil which is tinned both inside and outside.

Write today for illustrated literature.

Halsey W. Taylor Company

Warren, :: :: :: Ohio

AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.

300 Great Mills

Have Lessened Accidents Through

CLEAN FLOORS

Slippery, oily floors that threaten the safety of workers have no place in textile mills. Three hundred great institutions equipped with the FINNELL SYSTEM of Power Scrubbing have completely eliminated that source of danger. *Every* textile mill can do the same—at a *financial profit.*

Big Money Savings, Too!

The Finnell System pays for itself in a few months by the saving it effects in the cost of scrubbing. Additional savings result from (1) better working conditions; (2) cleaner production; (3) less waste and soilage; (4) healthier and happier employees; and (5) better light and air. There's an economical size outfit for any size mill.

Write for Proof

Write today for complete information on the dividend paying Finnell System. No obligation.

AMERICAN SCRUBBING EQUIPMENT CO.

General Offices and Factories:

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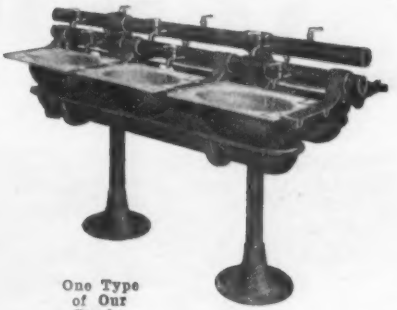
ATLANTA
BALTIMORE
BOSTON
BUFFALO
CHICAGO
CLEVELAND
DENVER
DETROIT
LOS ANGELES
MINNEAPOLIS
NEWARK
NEW ORLEANS
NEW YORK
PHILADELPHIA
PITTSBURGH
ST. LOUIS
SAN FRANCISCO

"Clean Floors Reflect Clean Business"

Are your floors CLEAN?

Sanitary Wash Bowls



One Type of Our Bowls.

Our Line of Sanitary Equipment Includes:

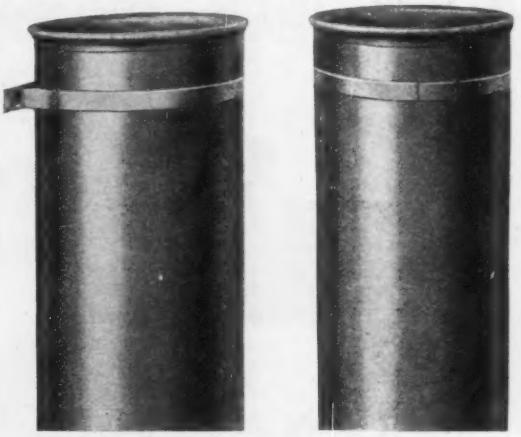
Sanitary Wash Bowls (in batteries), Bubbling Fountains (plain and ice cooled), Metal Lockers, Metal Stock and Pattern Storage Racks, Metal Shelving, Metal Cabinets, Vault Fixtures, Soda Kettles (40 and 60 gallons), Metal Stools and Chairs, Water Mixers, Work Benches, Bench Legs, Full Line of Plumbing Fixtures, etc.

Send for Complete Catalog.

Manufacturing Equipment & Engineering Co.

136 FEDERAL STREET, BOSTON, MASS.

Works and Mail Address: Framingham, Mass.



SAFETY FIRST

O-C Patented Roving Can Indicators provide the best, simplest and most efficient method of avoiding mixed work in the Carding Department. By eliminating painting and the tying of strings, they remove the unsightly conditions which generally result when trying to avoid mixed work. They eliminate the need for an extra supply of cans, thereby allowing all cans to be in use at the same time, avoiding delay.

A trial order will convince you. Sample sent and prices quoted on application.

O'MALLEY & CARROLL

Manufacturers of

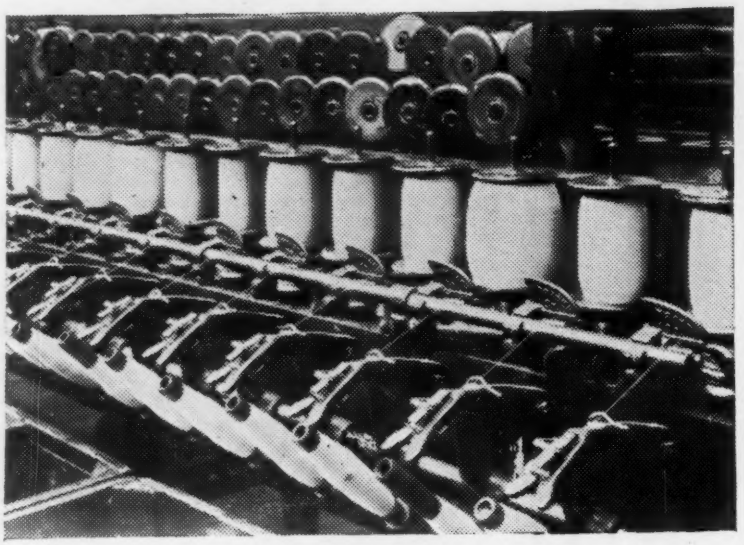
Roving Can Indicators

UTICA NEW YORK

A Practical Spooler Tension That Works

L-V-B SPOOLER TENSION

PRODUCES GREATER PRODUCTION AND BETTER SPINNING



L-V-B Tension Device in New Bedford Mills.

Change from Warp to Filling Wind

Try it out at our expense.

Send two filled bobbins and we will forward sample tension on approval.

50% Saving in Waste

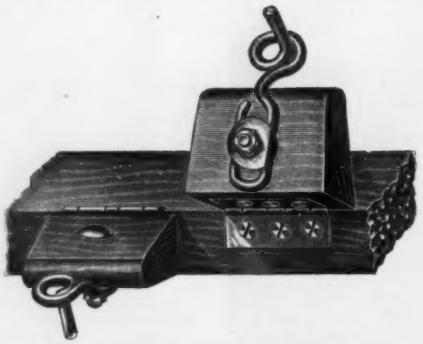
Ask for list of Mills that are using L-V-B Tensions.

Address

Textile Specialty Co.

P. O. Box 531
New Bedford, Mass.

The Palmer Adjustible Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

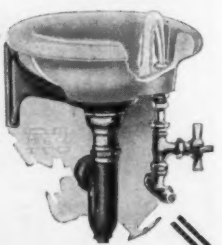
Patented and manufactured by

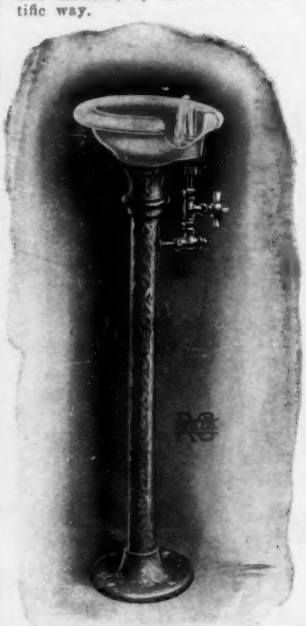
THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

IN CHOOSING A DRINKING FOUNTAIN

the buyer should purchase the fountain that has been proven absolutely sanitary and efficient, by actual tests in a scientific way.





"VERTICO-SLANT" STREAM FOUNTAINS

are in accord with science. Workers need hygienic drinking water to keep them physically fit to efficiently do their work.

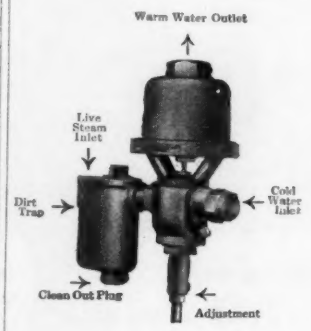
Why not modernize in every particular by utilization of drinking fountains that have been made absolutely safe? A refreshing drink of water means renewed energy to the man on the job and water that is as nearly germ-free as a fountain can keep it should be provided. All the essentials of sanitation are embodied in the "VERTICO-SLANT" Stream Drinking Fountain.

Write for full details.

RUNDLE-SPENCE MFG. COMPANY

MILWAUKEE, WIS.

After Work is Over



The Powers Steam and Water Mixer—An Instantaneous Water Heater.

Thermostatically controlled against overheating of water.

When wash-up time comes, you will save time and annoyance for your operatives by giving them wash water heated by the

POWERS
Steam and Water Mixer

This is the most economical water heater you can install for your wash-rooms, shower baths, etc. Thermostatically controlled and entirely automatic in operation. Mixes live steam and cold water, and delivers water of any desired temperature, instantly. A convenience and an economy.

Try One 30 Days at Our Risk

THE POWERS REGULATOR CO
Specialists in Automatic Heat Control

985 Architects Building, NEW YORK
2761 Greenview Avenue, CHICAGO
596 Boston Wharf Building BOSTON
The Canadian Powers Regulator Co., Ltd., Toronto, Ont.

(1076-C)

Howard Bros. Mfg. Co.

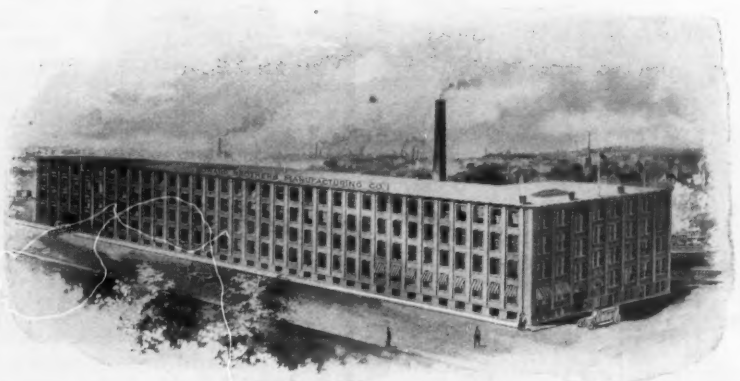
Established 1866

Atlanta, Ga. Worcester, Mass. Philadelphia, Pa.

CARD CLOTHING

Napper Clothing

Wire Heddles
Cylinder Fillets
Doffer Fillets
Top Flats Reclothed



Hand Stripping Cards
Stripper Fillets
Burnisher Fillets
Emery Fillets

Southern Agents

E. M. TERRYBERRY, 1126 Healey Building, ATLANTA, GA.

PERBURCO
HOSPITAL EQUIPMENT
Whatever your needs for a first-aid room or the largest hospital, PERBURCO Hospital Equipment will satisfactorily and economically fill your requirements better than any other equipment. Acknowledged and specified by the profession and leading authorities. We will be glad to send experts to advise with you and specify equipment best suited to your needs.
Our new catalog gladly sent on request.
PERRYMAN-BURSON CO.
Expert Truss Fitters
23 Houston St., Phone Ivy 5522
ATLANTA, GA.

BOSTON HANK CLOCKS

The Recognized Standard for Accuracy and Durability

Many thousands in use.

Lasts many years.

All parts interchangeable.

Prompt delivery.

Special clocks to order.

Write us your requirements.
Our experience is at your command.

Boston Clocks tell just what the production from each frame actually is

BOSTON MACHINE WORKS CO.
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Offices at
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BYRD'S SERVICE

A combination of

EFFICIENCY, PROMPTNESS and ECONOMY in the production of printing

With the largest printing equipment in the Southeast, and with thirty-five years experience, we are in position to handle all of your printing requirements from the smallest office form to the largest illustrated catalog.

Send your next requisition for printing to us—we make the price right.

BYRD PRINTING COMPANY

Established 1887

BYRD BUILDING :: ATLANTA, GA.

THE "Southwestern Iron Clad"

Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT!
PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through
all principal distributors.

The Southwestern Broom Mfg. Co.
Evansville, Indiana

The Toilet Partitions Do Make a Difference

CLEAN-CUT, sanitary toilet compartments — like this SANYMETAL installation in the Lavatory Building of the Lorain, Ohio, plant of the National Tube Company—**do** make a difference. They make a difference in the attitude of employees toward any company, and in the cost records of the company, too. For the upkeep on SANYMETAL is next to nothing.

Even if you are not expanding your plant right now, it may pay you to install better toilet accommodations in your present buildings. Remember that SANYMETAL can easily be moved and re-erected.

Built in flexible units, easy to install in any space or layout, SANYMETAL, when erected, is and remains absolutely rigid. Made of the famous rust-resisting Armco Iron, with all hardware and every base casting electro-zinc plated by our special process, SANYMETAL Toilet Partitions are rust-proof. SANYMETAL is entirely free from cracks or crevices to collect dirt or germs. The impervious enamel finish, slant lip mouldings, and water-proof shoe at base, **shed** all dirt and moisture. SANYMETAL looks clean, is clean, stays clean. And it's equipped with SANYMETAL Gravity Roller Hinges on all toilet doors—the springless hinge that never wears out. Write for Catalog No. 2 on Toilet Partitions.

You can Buy--

SANYMETAL Steel Toilet Doors for use on marble or wood partitions. The cost of one of these doors, with standard hardware and baked enamel finish, is about the same as that of a wood door painted and fitted. We don't need to tell you which will last longer.

THE SANYMETAL PRODUCTS COMPANY
986 E. Sixty-fourth St., Cleveland, Ohio

Sanymetal
TRADE MARK U. S. REG.

To Crowd Down Handling Costs

The fact that the leading textile mills are still enjoying the use of their original purchases made ten years ago proves the outstanding economy of the Lewis line of Box Trucks, Transfer Trucks and Baskets.

You've got to crowd them down, Mr. Superintendent.

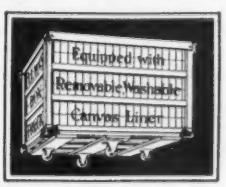
And you *can!*

Lewis Box Trucks save all along the line — they're strong; light in weight! Pilferproof. They have detachable and washable canvas liners that keep the goods clean and guard them from snags and soiling. The casters have thread guards to avoid delays. Lewis Box Trucks can be coupled together and run as a train if desired.

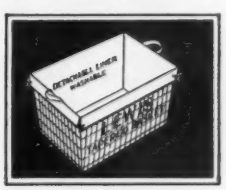
We ship K.D.

You'll get years of service from every truck. Prices much reduced.

Various sizes. In writing give desired inside length, width and depth, and outside dimensions of motor truck box.



An open Lewis Box Truck with liner and 4½" high stationary thread guard side casters and 3½" high swivel end casters.



The Tapered Hand Basket is particularly adapted to the handling of lighter colored goods that must be kept clean in process.

G. B. LEWIS COMPANY

WATERTOWN, :: WISCONSIN

BOX TRUCK DIVISION C 8

J. D. Collins Sales and Engineering Co., 927 Grant Bldg., Atlanta, Ga.
John Cronin, 118 Pearl Street, Boston
Distributors for New England
Distributors for Illinois, Indiana, Michigan, Wisconsin, Minnesota and Iowa

LEWIS Box Trucks

PRINTING

WE do it for some of the largest mills in the South—*Why not for yours*

If our prices and service were not right, we could not do it.

THE A. J. SHOWALTER COMPANY

Dalton, Georgia.

The Bayley B. T. U.

A complete self-contained heating and ventilating unit that distributes tempered air evenly throughout the room. It adapts itself readily to permanent or temporary heating requirements, is easily installed, requires no piping except supply and return from source of steam. Simply set on floor where wanted, connect steam and return piping, and wiring to motor and it's ready to run.

Send for bulletin today.

Dept I

Bayley Manufacturing Co.

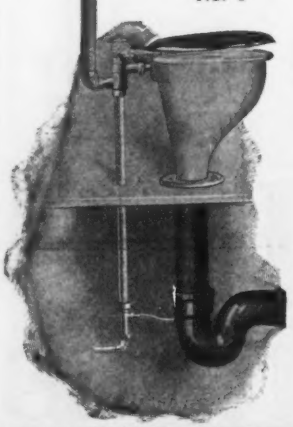
732 Greenbush, Milwaukee, Wis.

VOGEL

PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.



No. 1

- Enameled Roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.

WILMINGTON DELAWARE

***Kleradesk*—your present system—plus**

The Kleradesk adapts itself to your peculiar requirements—combining both horizontal and vertical handling of desk papers.

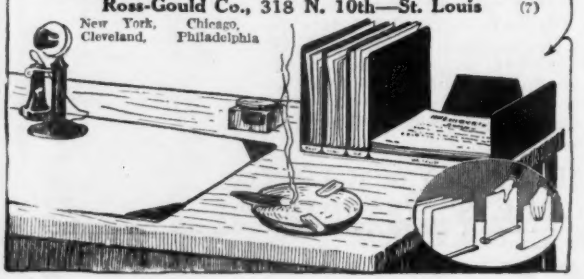
Sorts and routes departmental mail; holds reference papers out of way but immediately at hand when needed. Saves time. Efficient. Convenient.

A Steel Sectional Device

Add compartments as required. Vertical sections $1.20 each. Four-compartment combination illustrated below $6.65. Indexed front and back. Write for free, instructive, illustrated folder, **"How to Get Greater Desk Efficiency."**

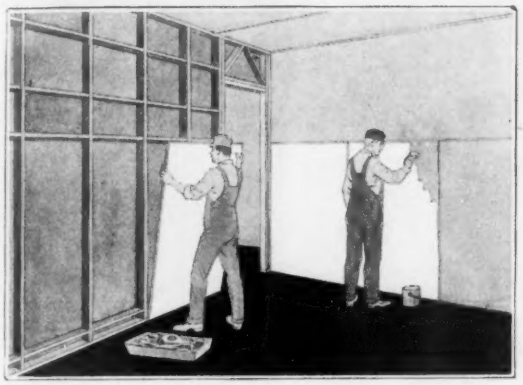
Ross-Gould Co., 318 N. 10th—St. Louis (7)

New York, Chicago, Cleveland, Philadelphia



Cornell Wood Board

Eight lengths, 6 to 16 ft.,—two widths—"Cornell 32" "Cornell 48"



Why Cornell makes better Walls and Ceilings than plain wallboard or plaster

Because of our vast timber tracts, mills and low-cost water power, you pay no more for Cornell Panels, yet you get a board that comes all primed for painting or calcimining—"Mill Primed"—and you save the work and expense of a priming coat.

You get the only board with a beautiful "Oatmeal" finish that rivals fashionable oatmeal wall paper.

You get a board of pure wood fiber—a board that is "Triple Sized" in the making, giving it triple the ordinary resistance to moisture, expansion, contraction, sound and change in temperature.

For walls, ceilings and partitions in mill homes, cafeterias, stores, community buildings, Y. M. C. A. and Y. W. C. A. homes, offices, factories, garages—Cornell is in highest favor because of its economy, handsome surface, rigidity and strength.

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Write for sample board, quotations in carloads or less than carloads, and color-book No. CO-1 of finished interiors free.

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Get the Most Daylight for Your Money

THREE outstanding features make Dixielite the leading finish for walls and ceilings of mills, factories, and warehouses.

First, Dixielite is white. Not a near-white, but a pure, bright white that distributes evenly, every ray of daylight to the furthest and darkest corners.

Second, age does not dim its lustre. Time cannot turn it yellow. It is washable. Soap and water keep it brilliantly new.

Third, Dixielite wears longer. It dries with a hard finish that will not chip, crack or peel. Figured over a span of years, Dixielite is really the cheapest.

It is the perfect white finish for walls and ceilings—a product with over seventy years of experience back of it. And it is made by one of the oldest paint and varnish makers in the country. Write today for Booklet No. 51.

WADSWORTH, HOWLAND & CO., Inc.

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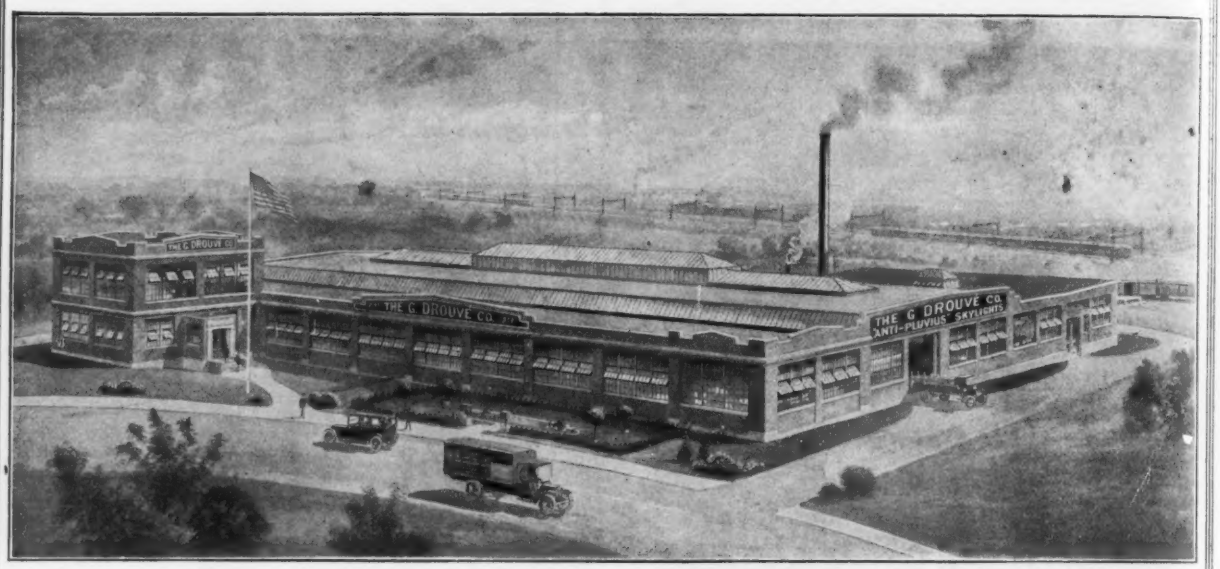
DIXIELITE



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Forty thousand square feet devoted exclusively to the manufacture of

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"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

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"White Permanence" in walls and ceilings has long been a problem to textile engineers. The answer has been found in ZEMCO-LITE—"The Cement Paint."

ZEMCO-LITE is a cement paint with PURE WHITE PORTLAND CEMENT as its base. Its lasting qualities are those of cement. Walls painted with this superior paint STAY WHITE, do not crack, peel, chip or blister.

Zemco-lite

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"The Cement Paint"

It is the ideal and economical paint for the cotton mills of the South. Climate has no effect on it.

A ZEMCO-LITE wall is a pure white semi-flat finish which stays white, never discoloring, and because of its wonderful light refracting properties it gives an interior perfectly lighted and free from glare.

ZEMCO-LITE is put up in dry powder form, but it is a paint, NOT A CALCIMINE. Its initial cost per gallon, compared with other paints, is very low, its covering capacity large, and it is applied more easily and cheaply that lead or oil paints.

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Hard pulling cylinders mean stretched warps and poor weaving. With ball bearings on the cylinders, a pull of less than twenty pounds will keep them in motion, so that there is no excessive strain on warps; the elasticity of the yarn is preserved, and better weaving is possible.

Our ball bearing boxes for slashers are moderate in cost, and can be installed by anyone in about an hour. They are dust-proof, and require oiling only two or three times a year.

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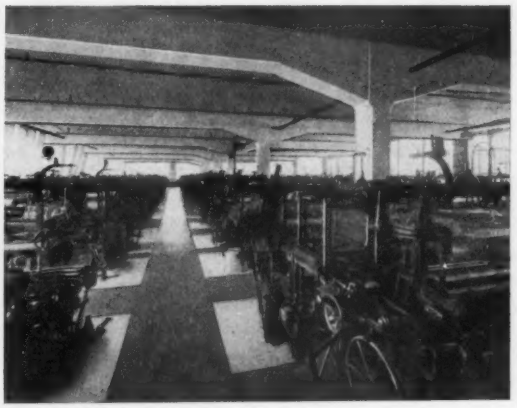

Interior of B. Edmund David, Inc., Factory at Wilkes-Barre, Pa., 64 feet wide with only Single row of Columns.

Possession in only 53 Working Days

Cellar excavated from solid rock
2-Story Concrete Building, 158 x 64 feet
No night work—little overtime
Cost to owner 4% less than estimated

ON April 1, 1921, after considering competitive bids, B. Edmund David, Inc., awarded us a contract to design and construct a factory on a fixed fee basis. Possession of the new building was required not later than August 1, 1921, the day the lease on the old factory of B. Edmund David, Inc., expired.

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While our paramount purpose was speed, at the same time we managed to economize. We saved our client 4% of the estimated cost on the entire job.

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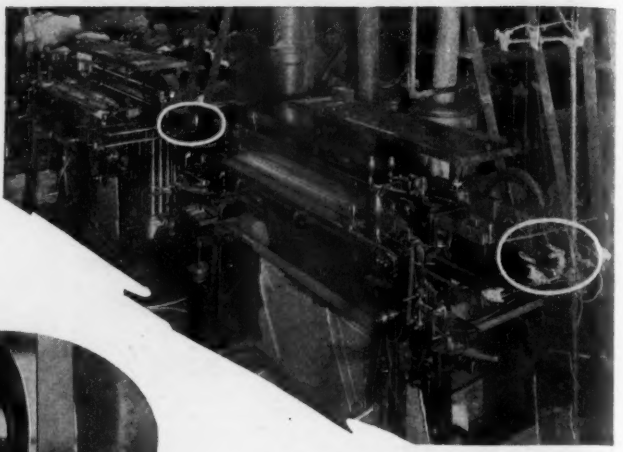
Friction Control on Knitting Machines

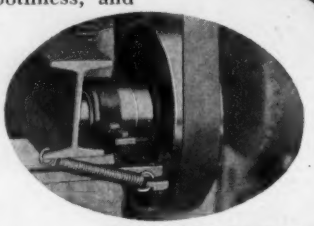
Greater convenience, higher efficiency, and better service are obtained by the use of Johnson Clutches.

The Lion Mills use Dubied Knitting Machines in the production of sweater cloth. They have remodeled several hand machines to incorporate a mechanical drive with Johnson Clutch Control, two of these units being shown in the illustration. There are four in all.

What do they think of Johnson Clutches That in convenience and efficiency, no other method can compare. That the quick response, the smoothness, and above all the durability of the Johnson Clutch is indispensable on high grade machines of this type. One of these clutches has been in use for over ten years, with absolutely no attention whatever, and all are giving excellent service.

The value of Johnson Clutches on knitting machines has been repeatedly demonstrated. But all textile machinery—spinning frames, twisters, cards, looms—no matter whether it is driven from lineshaft or by individual motor will perform at its best when controlled by Johnson Clutches.





Illustrations by courtesy of the Lion Mills, Hartford, Conn., showing Johnson Clutches driving their Dubied Knitting Machines.

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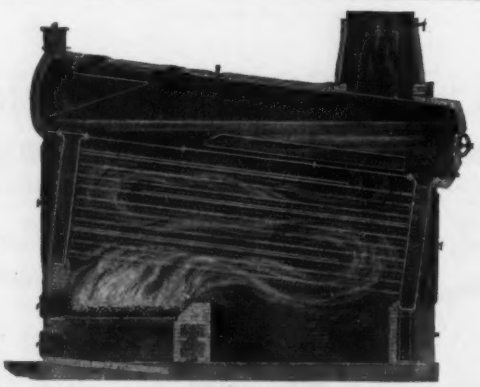

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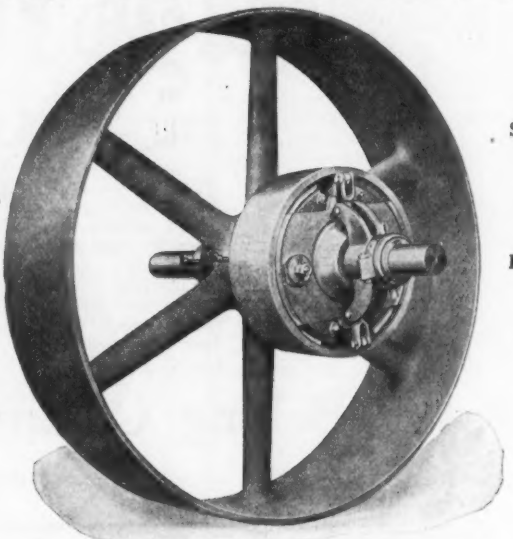

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D-A Lubricant is purely a densified, mineral oil
It never leaves any gum or residue

To cling to meta', an oil must have body. To have body it must be a NATURAL OIL, an oil of the same undisturbed elements as Nature produced it for lubricating purposes, not an oil that has been bleached and diluted with artificial fillers and binders to make it look harmless.

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Write for full particulars and price.

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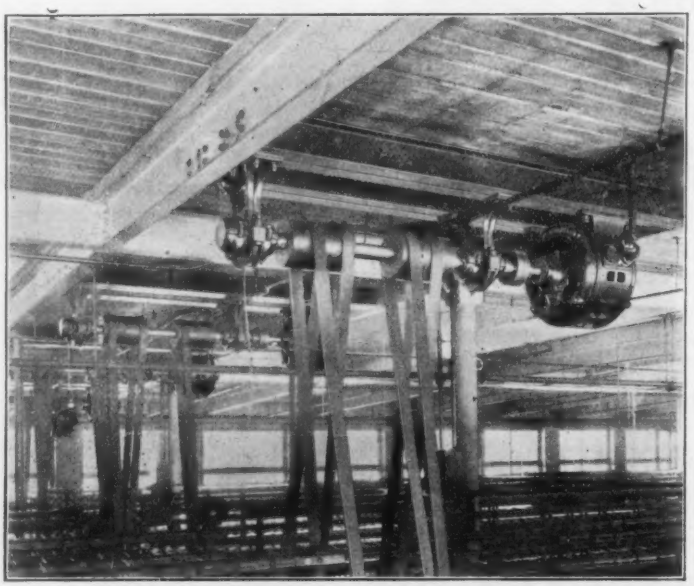

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For the Electrification of Old Mills

Avoids Shifting of Frames

The equipment consists of a special spinning frame motor for ceiling suspension equipped with conduit terminal box; bushing type flexible coupling; adjustable hangers; shaft with paper pulleys for driving four spinning frames.

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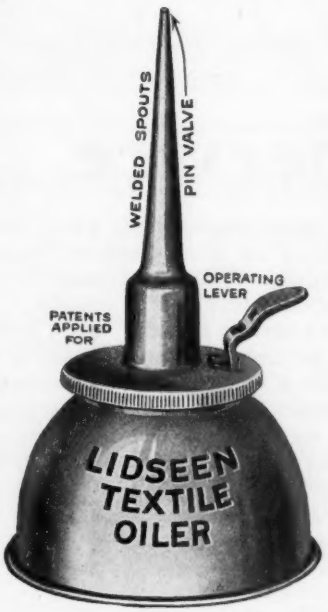

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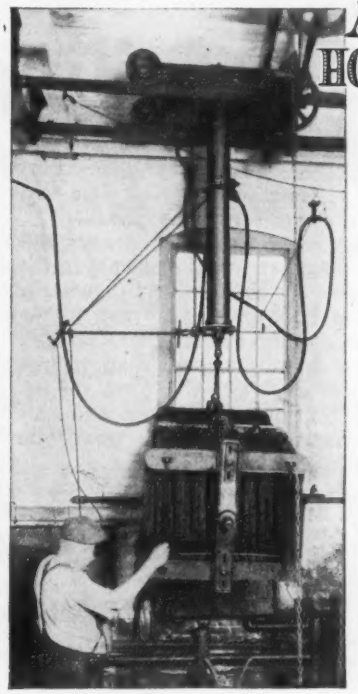

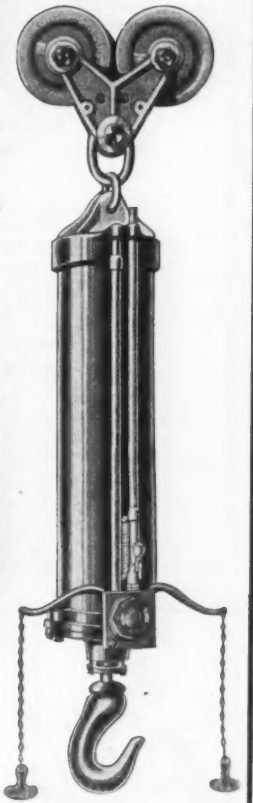

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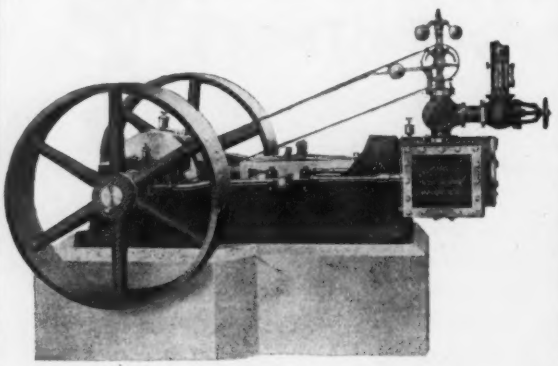

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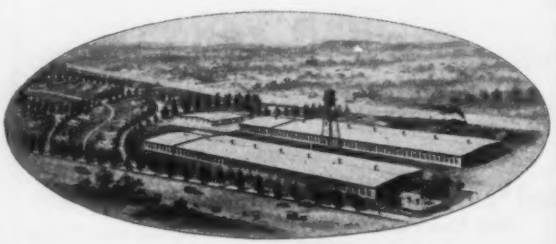

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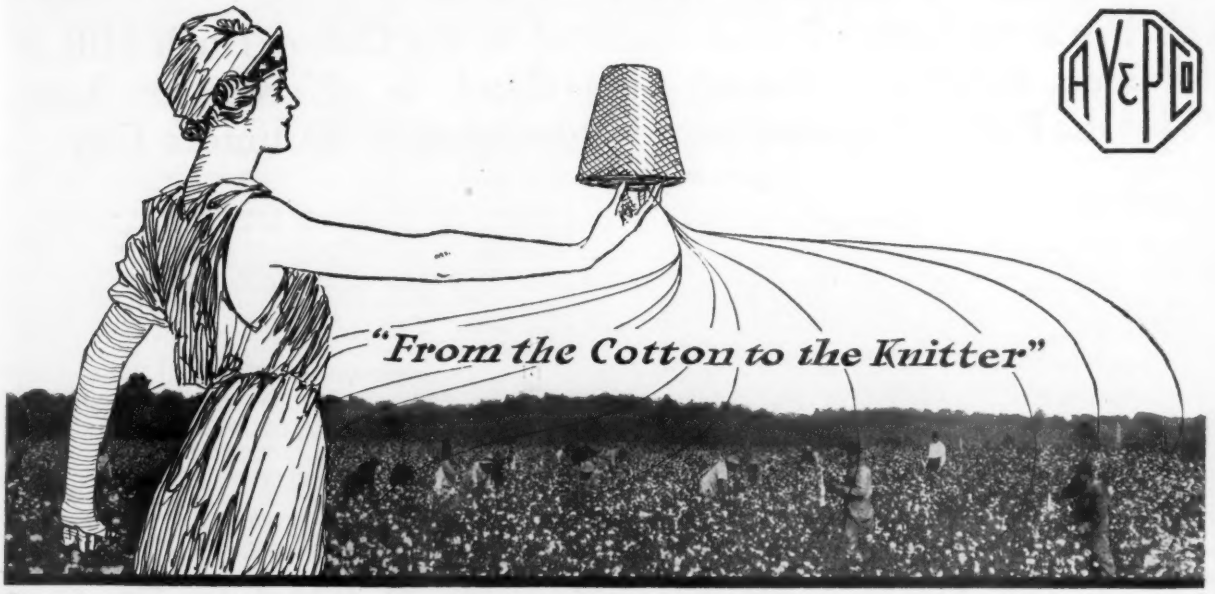

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The Property Listed Below, Located in the Cotton Duck Mill, at Warren, Baltimore County, Maryland, is offered for Sale by the Public Improvement Commission of Baltimore City

TERMS AND CONDITIONS OF SALE.

All property herein listed will be sold for cash, payable at the time of purchase, except as may be otherwise specially arranged with the seller.

Property purchased must be removed at the expense of the purchaser and within such time as may be agreed upon when the sale is made. If such property is not removed within the time specified then the seller shall have the right and privilege of re-selling the same for the account of the purchaser or making such other disposition thereof as it may deem proper.

The purchaser agrees to remove the property purchased, in accordance with the directions of the seller and further agrees, by bond or otherwise as may be requested by the seller, to indemnify and save harmless the seller from all claims, loss or damage which it might sustain because of such removal.

The property herein listed can be seen on the premises only upon presentation of written authority from the seller.

It is believed that the designations and descriptions of the property herein listed are accurate, but the seller assumes no responsibility or liability for any inaccuracies in descriptions, errors, mistakes or omissions contained herein.

A. COTTON YARN MACHINERY.

1. PICKING SECTION.

Item No.	Pieces.	Size	ARTICLE.	Maker	Year	Location*
101-102	2	36″	Opener Feeder	Saco Lowell	1917	13½.1
103	1		Lattice Feed Table for 2 Openers	Saco Lowell	1917	13½.1
104	1	13″	Gal. Iron Conveyor Pipe (98 ft.) and Hopper	Saco Lowell	1917	Yard
105	1	No. 9	Condenser	Saco Lowell	1917	7.3
106	1		Autom. Distributor delivering to 2 feeders	Saco Lowell	1917	7.3
107	1	No. 7	Monogram Exhauster	Sturtevant	1917	7.3
108-109	2	40″	Single Beater Breaker Lapper with Auto Feeders	Saco Lowell	1917	7.3
110	1	40″	Single Beater Finisher Lapper, P. & D. Evener	Saco Lowell	1917	7.3
111-112	2	40″	Single Beater Finisher Lapper, P. & D. Evener	Saco Lowell	1902	7.3

2. CARDING AND DRAWING SECTION.

201-222	22	40″	Revolving Flat Cards—Single Coiler for 12x36″ Cans	Saco Pettit	1903	1.3
223-228	6	40″	Revolving Flat Cards—Single Coiler for 12x36″ Cans	Pettit	1896	1.3
229	1		Stripping Roll			1.3
230	1		Drum Grinding Roll			1.3
231	1		Traverse Grinding Roll			1.3
232	1		Thread Extractor	Hilliard & Goldsmith	1912	1.5
233-234	2		First Drawing Frame—6 Deliveries, Metallic Rolls	Pettit	1895	1.3
235	1		Second Drawing Frame—6 Deliveries, Metallic Rolls, Electric Stop	Howard & Bullough	1896	1.3
236	1		Second Drawing Frame—6 Deliveries, Leather Front Rolls	Pettit	1896	1.3

3. ROVING SECTION.

301-302	2	72 Sp.	Slubbers 11″x5½″ Bobbin	Saco W. P.	1898	1.3
303-304	2	96 Sp.	Slubbers 12″x6″ Bobbin	Saco Lowell	1916	1.3
305-306	2	128 Sp.	Intermediate 10″x5″ Bobbin	Saco Lowell	1916	1.5
307-308	2	96 Sp.	Intermediate 8″x4″ Bobbin	Saco W. P.	1882	1.5
309	1	72 Sp.	Intermediate 8″x4″ Bobbin	Saco W. P.	1882	1.5
310-313	4	76 Sp.	Fly Frame 8½″x3½″ Bobbin (13 Frames—1,160 Spindles.)	Lowell	1880	1.5

4. SPINNING SECTION.

401-407	7	144 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1882	1.4
408-410	3	112 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1896	1.4
411-416	6	160 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1882	1.4
417	1	208 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1930	2.3
418-422	5	208 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1900	1.4
423-425	3	128 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1882	1.4
426	1	240 Sp.	Ring Frames 2¾ Ga. Warp Separators	Whitin	1900	2.2
427-428	2	272 Sp.	Ring Frames 2¾ Ga. Warp Separators	Saco Pettit	1904	1.4
429-430	2	256 Sp.	Ring Frames 2¾ Ga. Warp Separators	Saco Pettit	1904	1.4
431-432	2	288 Sp.	Ring Frames 2¾ Ga. Warp Separators	Saco Pettit	1905	2.2
433	1	144 Sp.	Ring Frames 2¾ Ga. Warp Separators	Lowell	1898	1.5
434	1	144 Sp.	Ring Frames 2¾ Ga. Warp Dismantled	Lowell	1898	2.2
435	1	160 Sp.	Ring Frames 2¾ Ga. Warp Separators	Lowell	1898	1.4
436-437	2	160 Sp.	Ring Frames 2¾ Ga. Warp Separators (37 frames, 6,432 spindles)	Lowell	1898	2.2

5. SPOOLING SECTION.

501-502	2	60 Sp.	Spoolers 5″ Ga. x 6″	Bridesburg	1880	2.2
503	1	80 Sp.	Spooler 5″ Ga. x 6″	Whitin	1882	2.3
504-505	2	80 Sp.	Spoolers 5″ Ga. x 6″	Whitin	1882	2.2
506	1	104 Sp.	Spooler 6″ Ga. x 6″	Whitin	1902	2.3
507	1	80 Sp.	Spooler 5½″ Ga. x 6″ (7 Spoolers—644 Spindles.)	Draper	1899	2.3

6. TWISTER SECTION.

601	1	100 Sp.	Twister 5½″ Ga. 6″ Spool—4 High Creel	Draper	1906	2.2
602-607	6	100 Sp.	Twister 5½″ Ga. 6″ Spool—7 High Creel	Draper	1906	1.5
608	1	200 Sp.	Twister 2¾ Ga. 8″ Spool—4 High Creel	Draper	1899	2.2
609-613	5	100 Sp.	Twister 5½ Ga. 6″ Spool—6 High Creel	Whitin	1915	2.2
614-619	6	84 Sp.	Twister 4½ Ga. 6″ Spool—6 High Creel	Hopedale	1900	2.2
620-627	2	96 Sp.	Twister 5½ Ga. 6″ Spool—6 High Creel (21 Twisters—2,096 Spindles.)	Hopedale	1890	2.2

7. WARPER AND WINDER SECTION.

Item No.	Pieces.	Size	ARTICLE.	Maker	Year	Location*
701	1	2254 Sp.	Denn Warper, 5¼x6 Spools—Electric Stop Motion	Globe M. Co	1903	2.3
702	1		Heavy Baller for Dean Warper	Globe M. Co	1903	2.3
703	1	176″	Denn Warper	C. & K.	1905	2.1
704	1		Evans Cone Countershaft Drive for 176″ Warper		1905	2.1
705	1	44″	Beamer	Bridesburg	1890	2.3
706-707	2	44″	Beamer			
708	1	15 Yd.	Circular Warp Mill, 117 Spool Creel	Bridesburg		1.5
709	1	15 Yd.	Circular Warp Mill, 117 Spool Creel	Bridesburg		2.3
710	1	6 Sp.	Tube Winder, Style 5	Univ.M. Co.	1918	2.2
711-712	2	10 Sp.	Cop Winder	Lazenby	1905	2.1
713-715	3	10 Sp.	Cop Winder	Lazenby	1905	1.1
716-717	2	30 Sp.	Quiller	N. Chelford	1905	1.2
718	1	10 Sp.	Quiller	N. Chelford	1905	2.3
719-721	3	30 Sp.	Filling Winder	N. Chelford	1905	1.2
722-723	2		Yarn Tester			2.2
724	1		Autom. Banding Machine—Weeks	Hopedale		2.2
725	1		Warp Tying In Machine — Portable Mod. K.	Barber-Colman		1.1

B. COTTON WEAVING MACHINERY.

8. LOOM SECTION.

801-814	14	42″	Heavy Loom—Plain	Lowell	1880	3.2
815-821	7	33″	Heavy Loom—Plain	Whitin	1888	1.2
822-831	10	45½″	Heavy Loom—Plain	Whitin	1900	1.2
832-837	6	34″	Heavy Loom—Plain	Bridesburg	1892	1.2
838-855	18	34″	Heavy Loom—Plain	Bridesburg	1884	1.1
856-861	6	44″	Extra Heavy Looms—Plain—Equivalent to Light Duck	Bridesburg	1884	1.2
862-870	9	34″	Extra Heavy Loom	Bridesburg	1890	1.2
871-872	2	47½″	Extra Heavy Loom	Whitin	1907	1.2
873-874	2	49½″	Extra Heavy Loom	Whitin	1907	1.2
875-876	2	64″	Heavy Duck Loom	Whitin	1915	11.1
877-878	2	58″	Heavy Duck Loom	Whitin	1915	11.1
879-880	2	54″	Heavy Duck Loom	Whitin	1915	11.1
881-884	4	40″	Heavy Duck Loom	Whitin	1915	11.1
885	1	72″	Heavy Duck Loom	Whitin	1915	11.1
886	1	82″	Heavy Duck Loom	Whitin	1915	11.1
887	1	52″	Heavy Duck Loom	Whitin	1912	1.1
888	1	140″	Heavy Duck Loom	Whitin	1913	1.1
889-890	2	32″	Model M-2 Autom. Loom	Stafford	1918	11.1
891-892	2	36″	Model M-2 Autom. Loom	Stafford	1918	11.1
893-894	2	54″	Model M-2 Autom. Loom	Stafford	1918	11.1
895	1	156″	Special Extra Heavy Duck Loom	C. & K.	1905	1.1
896	1	120″	Special Extra Heavy Duck Loom	C. & K.	1905	1.1
897	1	96″	Special Extra Heavy Duck Loom	C. & K.	1905	1.1
898	1	140″	Heavy Duck Loom	C. & K.	1908	1.1
899	1	106″	Extra Heavy Duck Loom	C. & K.	1908	1.1
8100	1	76″	Medium Duck Loom	C. & K.	1905	1.1
8101	1	82″	Medium Duck Loom	C. & K.	1905	1.1
8102-8103	2	37″	Heavy Duck Loom	C. & K.	1905	1.1
8104	1	46″	Heavy Duck Loom	C. & K.	1905	1.1
8105	1	40″	Heavy Duck Loom	C. & K.	1905	1.1
8106	1	56″	Heavy Duck Loom	C. & K.	1905	1.1
8107	1	64″	Heavy Duck Loom	C. & K.	1905	1.1
8108	1	76″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8109	1	58″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8110	1	64″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8111-8112	2	40″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8113	1	50″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8114	1	82″	Extra Heavy Duck Loom	C. & K.	1905	1.1
8115	1	46″	Extra Heavy Duck Loom	C. & K.	1905	1.1

9. CLOTH FINISHING SECTION.

901	1	152″	Brush and Shearer—3 Brushes 152″	Curtis & Mable	1905	2.1
902	1	152″	Calender—2 12″ Rolls 152″	Curtis & Mable	1905	2.1
903	1	152″	Calender—2 10″ Rolls 152″	Curtis & Mable	1905	2.1
904	1	152″	Inspecting Spreader, 152″	Curtis & Mable	1905	2.1
905	1		Single Head Stitcher	Singer	1905	2.1
906	1	152″	Guide Rail for Stitcher (6 items above forming one machine.)	Curtis & Mable	1905	2.1
907	1	44″	Cloth Folder	Elliott	1888	2.1
908	1	44″	Brusher and Steam Calender	Curtis & Mable	1888	2.1
909	1		Cloth Baling Press—Vertical Screw, 30″x40″x60″	Evans	1888	2.1

10. MISCELLANEOUS.

1001	1		Platform Scale			2.1
1002	1		Overhead Trolley Track		1918	11.1
1003	1		Overhead Trolley Track		1918	1.1
1004	1	1½ ton	Overhead Trolley	Brown	1918	11.1
1005-1006	2	1½ ton	Overhead Trolley	Brown	1918	1.1
1007-1009	3		Hand Hoists for Trolley	Yale Towne	1918	
1010-1014	5	500 lb.	Platform Scale			
1015	1	700 lb.	Cotton Beam Scale			13
1016	1	4000 lb.	Elevator—5-Story—6′x7′—Belt Power	Flynn & Emerich		1.2
1017-1022	6		Warehouse Truck			
4000			Mill Supplies—Special List In Cluding Lap Rods and Trucks. Bobbins, Cans, Skewers, Spools, Beams, Combs, &c.			

C. POWER PLANT.

Item No.	Pieces.	Size	ARTICLE	Maker	Year	Location*
			II. POWER EQUIPMENT.			
1101-1102	2	150 H. P.	H. R. T. Boilers, 72″x18′, 78 3½″ Tubes, 100 lbs. Pressure	Morton-Reed Co.	1901	5.1
1103-1104	2		Boiler Fronts for above	Morton-Reed Co.	1901	5.1
1105-1106			Grates for above	Morton-Reed Co.	1919	5.1
1107			Brick Setting for above			5.1
1108	1	42″	Steel Stack, 100′, ¼″ Shell		1901	5.1
1109	1		Steam Piping to Engine, with Covering		1901	3, 4 & 5
1110	1		Steam Exhaust Piping and Head		1901	3.
1111	1		Duplex Feed Pump, 5½″x3½″x5″	Deane	1900	5.1
1112	1	10,000 Gal.	Cypress Water Tank		1914	4.1
1113	1	300 H. P.	Star Vacuum Feed Water Heater	Warren-Webster	1901	3.1
1114	1		Ballwood 20″x24″ Automatic Engine, 310 H. P.—Double Flywheel, Serial No. 5909	Ball &Wood	1901	3.1
1115	1		Feedwater Piping		1901	5.1
1116	1	No. 5	Fire Pump, Rotary	Falls & Jencks	1914	4.1
1117	1	No. 6	Fire Pump, Rotary	Falls & Jencks	1914	4.1
1118	1		Sprinkler Piping inside of Mill Buildings		1918	
1119	946		Sprinkler Heads, Installed		1918	
1120	1		Outside Fire Protection Piping		1918	Yard
1121			About 600′ 10″ Pipe, Underground		1918	Yard
1122			About 650′ 6″ Pipe, Underground		1918	Yard
1123-1126	3		3-Way Fire Hydrant		1918	Yard
1127	1		Dry Valve for Sprinkler System in Warehouse		1918	13
1128	1		Air Compressor for Dry Valve		1918	13½
1129	1	52″	Special—Pool-Leffel Turbine Wheel		1914	4.1
1130	1	56″	Standard—Pool-Leffel Turbine Wheel		1914	4.1
1131	1	48″	Standard—Pool-Leffel Turbine Wheel, Rebuilt		1914	4.1
1132	1	35″	Standard—Pool-Leffel Turbine Wheel, Rebuilt		1914	4.1
1133	1		Centrifugal Pump, 35 Gal. p. m.	Deming		Spring
1134	1		Woodward Turbine Governor, Type C, Style D, Ser. B-3794		1914	4.1
1135-1141	7		Flume Gate Hand Power Gearing		1914	Yard
1142	1		D. C. Generator—140 A. 120 V. 1,175 r.p.m., Class 4, Type M. P., Form H, No. 13420	General Electric	1914	4.1
1143	1		Switchboard and Rheostat for above Generator		1918	4.1
1144	1		Wiring from Generator to Opener Room		1918	
1145	1		D. C. Motor, Enclosed 7 H. P. (5 H. P. Continuous Rating), 1,200 r.p.m., Sprague	General Electric	1918	13½
2000			Shafting—Special List			
3000			Belting—Special List			
			12. REPAIR SHOP MACHINERY.			
1201	1	20″	Engine Lathe—10′ Bed	Perkins	1916	7.1
1202	1	20″	Drill Press			7.1
1203	1	No. 0	Gear Cutter	Gould		7.1
1204	1		Emery Stand			7.1
1205	1		Hacksaw	Miller Falls	1916	7.1
1206	1		Grindstone		1918	7.1
1207	1	12″	Rip Saw			7.1
1208	1	60 lb.	Acetylene Generator	Milbourn	1920	7.1
1209	1	Set	Acetylene Welding Tools	Milbourn	1920	7.1
1200			Vises, Bench and Blacksmith Tools			7 & 8

**The first figure designates number of mill building and the figure after period the floor in same.*

All Inquiries and offers for the same should be addressed to

ROLAND R. MARCHANT, CITY SOLICITOR 217 COURTHOUSE BALTIMORE, MD.

SOUTHERN BUSINESS DIRECTORY

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American Roofing & Paint Co., Inc.

Dealers in

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Roofing Contractors——::——Painting Contractors

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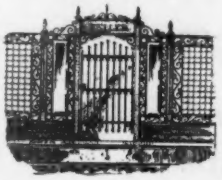
Atlanta, Ga.

SYDNOR'S SUPREME SERVICE

WELL DRILLING *and* **DEEP WELL PUMPS**

We do the engineering and have been solving water problems satisfactorily for 25 years for textile mills.

Sydnor Pump & Well Co., Inc., Richmond, Va.



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Established 1835.

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Electric Light, Power, Telephone and Bell Wiring for Residences, Stores and Factories. Estimates Furnished.

REWINDING FOR MOTORS, GENERATORS

All kinds of new and used Electrical Machinery bought, sold and exchanged.

All Kinds of Electrical Work—Motors Rented.

Telephone your wants. Local and Long Distance, Ivy 1788-1790.

Coal Is Now Moving

Place your order now for our KENTUCKY VELVET LUMP and there will be warmth and good cheer in your home. Ask some coal expert about this analysis.

Volatile matter	.38	Moisture	1.22
Fixed Carbon	.60	Sulphur	.32
Ash	1.10	B. T. U.'s	14948

We handle the Empire, one of the best mines in Alabama. Also steam and mine run coal from Kentucky and Tennessee.

Truitt Coal and Iron Company

ATLANTA, GEORGIA

CLASSIFIED ADVERTISING

WANTED—Position as overseer of sma'l spinning room, or as second hand of medium or large room. Have had experience as second hand and have ability to deliver the goods. Can furnish high-class references. Now employed. Age 25. Married. Address Horace L. Pratt, Box 139, Shawmut, Alabama.

Salesman Wanted

Salesman acquainted with buyers and who can obtain orders for sales and order books, can make favorable commission arrangements with leading Chicago concern in this line. Chicago Sales Book Co., 337 W. Madison St., Chicago.

FIRM desiring to broaden their activities would like to hear from concerns having commodities that could be used in textile mills. Would consider working on commission basis. Address Box 56, care COTTON, Atlanta, Ga.

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"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

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"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

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ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

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Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors
AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,
127-31 N. Third St.
Philadelphia, - Pennsylvania

Wanted Machine Salesman

to take over Southern Agency of an old established Dyeing Machine Manufacturing Company. Prefer man already covering North and South Carolina and Georgia. Give place of birth, age, education and experience in detail for past 10 years. Only those having ability and capable of showing sales record need answer. Address Box 45, care COTTON, Atlanta, Ga.

SALESMEN WANTED:

Salesmen wanted for quick selling line of specialties used by cotton mills, public utilities and industrial plants. Whole or part time. Liberal commission basis. Advise territory covered.

H. W. SWIFT

Desk C 222 Station E, Cleveland, Ohio

Do You Want to Sell It?

Probably you, like many other mills, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand equipment at a profit? COTTON is read by hundreds of Cotton Mills that are hardly touched by Northern journals.

You Can Sell Your Second-Hand Equipment

to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Building, Atlanta, Ga.

MACHINERY BARGAINS
FROM THE GIGANTIC
OLD HICKORY POWDER PLANT

COTTON DRY AND FINISHING HOUSE EQUIPMENT

30 COTTON DRYERS. Maker, Sargent's Sons Corporation. No. 24 six section 8' cotton dryers. Overall dimensions, 99'4" long, 15'5" wide, 7'10" high. Constructed throughout of metal angles and plates. Equipped with Model "M" self feeder which feeds direct onto 4x4 mesh, No. .092 gauge wire cloth endless belt or apron which extends entire length of dryer. Heating coils located at one side of dryer, 1½" pipe, to give 15,556 sq. ft. of heating surface. Hot air drawn through belt by 33" exhaust fans. All fans mounted on tube shafts with double ball bearings. Equipped throughout with automatic sprinkler system.

30 MIXING PICKERS. Maker, Sargent's Sons Corporation. Cylindrical type, 48" Mixing Pickers. 15 right hand, 15 left hand. Feed apron, heavy leather belt, with maple slats. Equipped with single pair fluted feed rolls, 3½" diameter. Feed roll bearings held by springs to insure proper tension. Main cylinder built up on heavy cast iron spiders, mounted on 2 15/16" shaft.
Cylinder provided with 6 heavy steel bars on lugs bolted to spider. Tight and loose driving pulleys 12" x 6". Speed 800 to 1,000 R.P.M. Capacity 600 to 800 lbs. per hour. Horsepower required, 4 to 8, according to material handled.

30 COTTON WASHERS. Maker, Sargent's Sons Corporation. 48" Special cotton washers or rinsers. Right hand and left hand. Complete with cast iron frame, pans, squeeze rolls, kicker and conveyor.

30 FEEDERS. Maker, Sargent's Sons Corporation. 48" Model "M" feeders for Sargent Dryers.

10 CONCENTRATORS. Maker, Noble & Wood Co. Right hand and left hand cylinder washers with octagon cylinder, diameter 44" length 42". Cylinder heads gulf cypress. Buckets 1" native pine. Cast iron outlet with wide discharge openings. Steel shaft passes through center of outlet and flanged on opposite side. Outlet and flange bolted to beaded cylinder head. Rotates at 6 R.P.M. Vat is 1'4½" wide, 6'9" long, 2'9" high.

WRINGERS.

70 42" Centrifugal Wringers. Maker, American Tool & Machine Company, Boston, Mass. Complete with 42" perforated steel basket shell, with steel top, basket 22½" inside depth, ⅜" steel. Bottom of basket composed of steel plate riveted to cast iron center, spindle plate, with valve opening. Steel spindle is bolted to plate with three tap bolts. Spindle is connected at top to a special brake and clutch, which is supported on 10", 1 25 lb. and 10" channels. Also a 7/8" shaft and flexible couplings directly connected to a 40 H.P. motor, which drives the wringer. The curb is made of ½" steel, 50" inside diameter, 2'6" deep, with cast iron bottom 12" deep.

18 Sets, 36" belt-driven Centrifugal Wringers. Maker, American Tool & Machine Co. Each set arranged in batteries of three. Supporting frames of cast iron, braced with steel rods; curb, bottom and top of cast iron; basket of perforated steel plates. Each wringer is equipped with clutch and driving pulley.

EXTRACTOR.

1 48" Overdriven Extractor. Maker, American Laundry Machinery Co. Basket made with shell of heavy galvanized boiler steel, perforated, and riveted to brass ring at top and at bottom to heavily galvanized casting, which fits around spindle shaft. Basket reinforced by cast iron bands. Outer curb of cast iron with detachable top or rim supported from frame tripod. Outer curb and inner basket swing free from base on tripod. Base cast in one piece, mounted on rubber bearings. Fitted with tool steel spindle shaft, driving pulleys, upper and lower bearings, brake and countershaft.

In addition, there is available at Old Hickory, power equipment, pumps, engines, machinery pipe, tanks and supplies. The following bulletins covering these items have been prepared and will be sent on request.

Bulletin No. 5, New and Used Belting.
Bulletin No. 7, Steel and Wood Tanks.
Bulletin No. 8, Boilers, Engines, Motors, etc.
Bulletin No. 9, Miscellaneous Equipment.
Bulletin No. 10, Pumps of All Kinds.
Bulletin No. 11, Blowers and Exhaust Fans.
Bulletin No. 12, Industrial Railway Equipment.
Bulletin No. 13, Hardware and Supplies.
Bulletin No. 14, Chemical Ware and Technical Machinery.

It is suggested that purchasing agents or plant superintendents be sent to Old Hickory to look over the supply of surplus materials and equipment, and inspect the articles in which they may be interested. Old Hickory is 12 miles from Nashville, Tenn, and can be reached by interurban cars or by automobile jitney busses, which run at frequent intervals. There are good hotel accommodations at Old Hickory, and it is advised that interested parties spend several days looking over the immense stocks at this place.

NASHVILLE INDUSTRIAL CORPORATION
JACKSONVILLE, TENN.

Buyers' Index

Acetylene Gas.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co.
Standard Gas Products Co.

Acetylene Welding Apparatus.
(See Welding Apparatus).

Accountants.
(See Auditors and Accountants).

Air Washers.
Bayley Mfg. Co.
Carrier Eng. Corp.
Parks-Cramer Co.

Air Compressors.
(See Compressors.)

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlorine.
(See Dyestuffs and Chemicals).

Appraisal Service
American Appraisal Co.

Aprons—Rub.
Smith & Furbush Machine Co.

Architects and Engineers.
Lockwood, Greene & Co.
Robert & Co.
Sniker & Lose.
Sirrine, J. E.
Stuhrman Edw. A.
Thompson & Binger, Inc.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Brooks & Doxey, Ltd.
Lord Bros.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Automatic Thin Place Preventer.
Clayton & Bentley Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.
U. S. Ball Bearing Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale Openers.
(See Openers.)

Baling Machines.
Brooks & Doxey, Ltd.
Lord Bros.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Famous Mfg. Co.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
National Shawmut Bank.
Textile Banking Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Crane Co.
Manufacturing Equipment & Engineering Co.
Sanymetal Products Co.

Batteries (Elec.).
(See Storage Batteries).

Beams.
Mossberg Pressed Steel Corp.
Walraven Co.

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads.
Mossberg Pressed Steel Corp.
Walraven Co.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Wood's Sons Co., T. B.

Belting (Leather, Canvas & Rubber
American Supply Co.
Fabreeka Belting Co.
Skinner & Co., Inc., R. D.
Walraven Co.
Williams & Sons, I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Brown Co., A. & F.
Dodge Sales & Eng. Co.
Link-Belt Company.
Morse Chain Co.

Belt Dressing.
Dixon Crucible Co., Jos.
Skinner & Co., Inc., R. D.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Columbia Novelty Mfg. Co.
Flexible Steel Lacing Co.

Belt Lacing.
Fabreeka Belting Co.
Columbia Novelty Mfg. Co.
Flexible Steel Lacing Co.
Skinner & Co., Inc., R. D.
Walraven Co.
Williams & Sons, I. B.

Belt Tighteners.
Brown Co., A. & F.
Link-Belt Company
Wood's Sons Co., T. B.

Bench Drawers.
Lupton's Sons, Co., David

Bench Legs (Pressed Steel).
Lupton's Sons, Co., David.

Benches (Park and Playground).
(See Playground Equipment).

Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Hauser-Stander Tank Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
(See Dyeing, Bleaching and Finishing Machinery).

Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
Bayley Mfg. Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
Clements Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Board Panels for Walls & Ceilings.
Cornell Wood Products Co.

Bobbins.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Compounds
Dixon Crucible Co., Jos.

Boiler Feed Water Purification.
American Water Softener Co.
Norwood Engineering Co.
Permutit Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
Dixon Crucible Co., Jos.
International Engineering Co.
Lunkenheimer Co.
Nashville Industrial Corp.

Boiler Grates and Stokers.
(See Grates and Stokers).

Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Hightower Box & Tank Co.
Lewis Co., G. B.
Standard Fibre Co.
Walke Box Co.

Boxes—Packing.
(See Packing Boxes).

Braid.
(See Tapes).

Brake Linings.
Diamond State Fibre Co.

Brazing.
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Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
(See Stocks and Bonds).

Brooms.
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Brushes—Mill.
Atlanta Brush Co.
Harris Broom Co.
Southwestern Broom Mfg. Co.

Brushes—Motor and Generator (Commutator).
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co

Buckets and Pails—Mill.
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
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Building Contractors.
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Building Material.
American Roofing & Paint Co.
Anchor Post Iron Works.
Barrett Co., The.
Blaw-Knox Co.
Birmingham Slag Co.
Carlisle & Gale Co.
Cornell Wood Products Co.
Drouve Co., G.
Dufur & Co.
Lockwood, Green & Co.
Lupton's Sons Co., David
Sanymetal Products Co.
Southern Cypress Mfg. Assc
Southern Wood Preserving Co.

Building (Portable-Steel.)
Blaw-Knox Co.

Buildings (Mill.)
Blaw-Knox Co.

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Brown Co., A. & F.
Dodge Sales & Eng. Co.
Southern Spindle & Flyer Co
Shambow Shuttle Co.
Walraven Co.

Cabinets.
(See Lockers).

Calenders.
Butterworth & Sons Co., H. W
Textile Finishing Machinery Co

Calender Rolls.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Bryan Electric Co.
Carter Electric Co.

Cans—Roving.
Standard Fibre Co.

Can Indicators (Roving).
O'Malley & Carroll.

Cars and Trucks—Fibre.
(See Trucks).

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

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Brooks & Doxey, Ltd.
Howard Bros. Mfg. Co.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

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Howard Bros. Mfg. Co.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Feeds.
Brooks & Doxey, Ltd.
Lord Bros.
Schofield, Wm. Co.
Smith & Furbush Mach. Co
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Textile Finishing Machinery Co., The.

Carrier Aprons.
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Carrier System.
Curtis Pneumatic Machinery Co.

Cases—Wooden.
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Castings.
Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Caustic Soda.
(See Bleaching Materials).

Ceilings (Wood Panel.)
Cornell Wood Products Co.

Cement Reinforcement.
Birmingham Slag Co.

Cement and Brick Coating.
American Cement Paint Co.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Wadsworth Howland & Co., Inc.

Central Station (Electric).
Georgia Railway & Power Co.

Centrifugals.
Cresson-Morris Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Mch. Wks.
U. S. & Cuban Allied Wks. Eng'g Corp.

Chain Drives.
(See Belting—Chain Link).

Chain—Block, Bicycle, Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Manufacturing Equipment & Engineering Co.
Southern Theatre Equipment Co.

Chemicals.
(See Dyestuffs and Chemicals).

Chlorine Gas.
Electro Bleaching Gas Co.

Cleaning Machine—Blower.
Clements Mfg. Co.

Clearer Cloth.
Philadelphia Felt Co.

Clocks—Hank, Etc.
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Clocks—Watchman.
Foxboro Co. Inc.

Closets—Water.
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Cloth—Roller, Clearer Slasher.
Philadelphia Felt Co.

Cloth Cutters.
Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

Cloth Reels.
Gallaudet Aircraft Corp.

Cloth Room Machinery.
Brooks & Doxey Ltd.
Butterworth H. W. & Sons Co.
Clayton & Bentley Co.
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Lord Bros.
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Scott & Co., Henry L.
Textile Finishing Machinery Co.
Wildman Mfg. Co.

Cloth Shrinking Machinery.
Reliance Machine Works.
Tolhurst Mch. Wks.

Cloth Testers.
Scott & Co., Henry L.

Cloth Winders.
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Clutches—Friction.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Wood's Sons Co., T. B.

Clutch Linings.
Brown Co., A. & F.

Coal.
Truitt Coal & Iron Co.

Coal & Ash Handling Machienery.
Link-Belt Company.

Coal Tar Disinfectants.
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Cocks.
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Color Pails.
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Comb Aprons.
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Commission Merchants & Dealers.
(See Cotton Cloth Commission Merchants).

Compressors—Air, Gas, Etc.
Allis-Chalmers Mfg. Co.
General Electric Co.
Goulds Mfg. Co.
U. S. & Cuban Allied Works, Eng'g. Corp.
Walraven Co., The.

Commutator Brushes.
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Concrete Reinforcement.
Birmingham Slag Co.

Concrete Forms (Steel.)
Blaw-Knox Co.

Condensers.
Allis-Chalmers Mfg. Co.

Conduits.
(See Elec. Mchry. & Supplies.)

Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
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Contractors and Engineers—Building.
Foundation Co.
Sirrine & Co., J. E.
Spiker & Lose.
Stuhrman, Edw. A.
Thompson & Binger, Inc.

Contractors—Electrical.
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Contractors—Painting.
American Roofing & Paint Co.

Contractors (Roofing.)
American Roofing & Paint Co.

Controlling Instruments—Temperature.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Conveyors—Belt.
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Conveying Machinery.
American Supply Co.
Collins, J. D.
Cresson-Morris Co.
Curtis Pneumatic Machinery Co.
Link-Belt Co
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Walraven Co.

Conveyors—Portable.
Link Belt Co.

Coolers.
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Coolers—Water.
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Cooling and Conditioning Machines.
Manufacturers Machine Co.

Cooling Towers.
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Copper Stamps and Stencils.
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Cordage Machinery.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cotton Yarn and Cloth Commission Merchants and Dealers.
Boger & Crawford.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Weimar Bros.
Woodward Baldwin & Co.

Cotton Merchants and Brokers.
Beer, H. & B.

Cotton Mill Machinery and Supplies.
Barber-Colman Co.
Blake Electric Mfg. Co.
Brooks & Doxey, Ltd.
Boston Machine Works Co.
Butterworth & Sons, H. W.
Clayton & Bentley Co.
Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Eclipse Textile Devices, Inc.
Firsching, J. A.
Fletcher Works.
Foxboro Co., Inc.
Gallaudet Aircraft Corp.
Greist Mfg. Co.
Howard Bros. Mfg. Co.
Howard & Bullough.
Lestershire Spool & Mfg. Co.
Lord Bros.
Manufacturers Machine Co.
Mossberg Pressed Steel Corp.
O'Malley & Carroll.
Phila. Drying Mchry. Co.
Philadelphia Felt Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Stafford & Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co.
Textile Service & Equip. Co.
Textile Specialty Co.
Tolhurst Mch. Wks.
Universal Winding Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

Cotton Storage.
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Cotton Tape Loom.
Fletcher Works.
Schaum & Uhlinger.

Cotton Yarn Mills.
(See Yarn Manufacturers).

Counters—Revolution, Hank, Pick, Etc.
Boston Machine Works.
Foxboro Co.
Slaughter, G. G.

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(See Restaurant Equipment.)

Coupling—Shaft.
Cresson-Morris Co.
Wood's Sons Co., T. B.

Covering—Roller.
Philadelphia Felt Co.

Cranes.
(See Hoists).

Creosoted Flooring, Blocks, Posts, Shingles etc.
Southern Wood Preserving Co.

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Cypress Lumber.
Southern Cypress Mfg. Asso

Cutters—Thread.
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Delivery Cases.
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Desks (Factory).
Lupton's Sons Co., David.

Dial Scales.
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Dies—Steel.
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Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Doffing Boxes—Mill.
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Doffing Cars.
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Doors—Steel.
Lupton's Sons Co., David

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Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
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Drinking Fountains.
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Drop Wires.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.

Drying Apparatus.
Bayley Mfg. Co.

Drying Forms—Hosiery.
Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dust Collectors.
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Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Yarn & Processing Co
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.

Dyeing, Bleaching, Finishing and Printing Machinery and Equipment
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
East Jersey Pipe Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hauser-Stander Tank Co.
Klauder-Weldon Dyeing Mch. Co.
Manufacturers Machine Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co. The.
Tolhurst Machine Works
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Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
Mathieson Alkali Works, Inc.
National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sandoz Chemical Co.
Sonneborn Sons Co., Inc., L.
Staley Mfg. Co., A. E.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

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Flexible Steel Lacing Co.
Ivanhoe Regent Works.

Electrical Engineers and Contractors.
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Electric Lighting Engineers.
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Electrical Machinery and Supplies.
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Estes Surgical Supply Co.
Perryman-Burson Co.

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Engines—Oil, Gas and Gasoline.
Allis-Chalmers Mfg. Co.
Walraven Co., The.

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Allis-Chalmers Mfg. Co.
Lombard Iron Works & Supply Co.
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Crane Co.
Lunkenheimer Co.
Nashville Industrial Corp.
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Walraven Co.
Westinghouse Electric & Mfg. Co.

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U. S. & Cuban Allied Works, Eng'g. Corp.

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Bryan Electric Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems).

Fasteners—Belt.
(See Belt Fasteners).

Feed Water Purifiers.
(See Boiler Feed Water Purification).

Feeders.
(See Automatic Feeders.)

Felt Cloth for Rolls.
Philadelphia Felt Co.

Felting Machinery.
Smith & Furbush Mch. Co.

Fence—Steel and Iron.
Anchor Post, Iron Wks.
Cyclone Fence Co.

Fence Posts (Creosoted Pine.)
Southern Wood Preserving Co.

Fibre Products.
Standard Fibre Co.

Fillets (Calender and Doffer, Strippers, Burnishing and Emery.)
Howard Bros. Mfg. Co.

Films (Motion Picture).
Bromberg Attractions, Arthur C.
Federated Films of Atlanta.
Savini Films, Inc., R. M.
Southern States Film Co.

Filters—Water.
American Water Softener Co.
Norwood Engineering Co.
Permutit Co.
Scaife & Sons Co., Wm. B.

Filters—Oil Removal.
Norwood Engineering Co.
Permutit Co.

Filters—Sand.
Permutit Co.

Finishing.
(See Dyers, Bleachers and Finishers).

Finishing, Bleaching and Sizing Materials.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Electric Smelting & Alluminum Co.
Ford Co., J. B.
India Alkali Works.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
Moore Oil Refining Co.
National Aniline & Chemical Co.
Newport Chemical Works.
Roessler & Hasslacher Co.
Sa doz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stearns, Wm. Taylor.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

Fire Doors and Hardware.
Fire Protection & Const. Co.
Sanymetal Products Co.
Vonnegut Hardware Co.

Fire Extinguishers.
Fire Protection & Const. Co.

Fire Hose.
(See Hose—Fire).

Fire Protecting Paint.
(See Paint).

First Aid Room Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.

Flexible Couplings.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

Flood Lights—Electric.
General Electric Co.

Flooring—Lumber.
Hightower Box & Tank Co.
Southern Cypress Mfg. Co.
Southern Wood Preserving Co.

Flooring (Wood Blocks).
Southern Wood Preserving Co.

Floor Scrubbing Machine.
American Scrubbing Equip. Co

Floor Scrubbing Powders.
India Alkali Works.

Floor Sweeps.
See Brushes.

Fluted Rolls.
Howard & Bullough.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co
Whitin Machine Works.

Founders.
Brown Co., A. & F.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works

Fountains—Drinking.
Crane Co.
Manufacturing Equipment & Engineering Co.
Miles Refrigerating Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

Friction Clutches.
(See Clutches—Friction).

Fuel.
(See Coal).

Fuses.
(See Elec. Mchy. and Supplies).

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas).

Gaskets.
Walraven Co.

Gauges (Steam Pressure, Etc.)
Foxboro Co., Inc.

Gauge Cocks.
Lunkenheimer Co.

Gauge—Oil.
Brown Co., A. & F.
Lunkenheimer Co.

Gauges—Water.
Lunkenheimer Co.

Gears—Silent.
Brown Co., A. & F.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

Gear Cutting and Cutters.
Brown Co., A. & F.
Cresson-Morris Co.

Gear Pullers.
General Electric Co.

Generators—Electric.
(See Motors and Generators).

Glassware and Dishes.
(See Dishes).

Glass Skylights.
Drouve Co., G.

Governors—Pump.
General Electric Co.

Graphite.
Dixon Crucible Co., Jos.

Grates—Boiler.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

Grates—Mechanical.
(See Stokers).

Grease.
(See Lubricants).

Grease Cups.
(See Lubricators).

Grinders—Card, Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).

Guards—Electric Lamp.
Bryan Electric Co.
Flexible Steel Lacing Co.

Guides—Thread.
Palmer Co., I. E.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

Gums.
(See Finishing and Sizing Materials).

Hangers.
(See Shafting and Hangers).

Hardware (Building.)
Sanymetal Products Co.
Vonnegut Hardware Co.

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.

Heads—Bobbin and Spool.
Lestershire Spool & Mfg. Co.

Heaters.
Bayley Mfg. Co.

Heating and Ventilating Apparatus.
(See Ventilating Apparatus).

Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.

Hoists.
Curtis Pneumatic Mchry. Co.
Link-Belt Company.
Morse Chain Co.
Walraven Co.

Hopper Feeders.
(See Automatic Feeders.)

Hose—Fire.
Collins, J. D.
Fire Protection & Const. Co.
Walraven Co.

Hosiery Dyeing Machinery.
Cocker Mach. & Fdry. Co.
Franklin Process Co.

Hosiery Forms.
(See Drying Forms).

Hosiery Yarns.
(See Yarn Manufacturers).

Hospital Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.

Hotels.
Hotel Martinique.
Hotel Sinton.
Hotel Tuller.

Houses (Steel.)
Blaw-Knox Co.

Humidifying Apparatus.
American Moistening Co.
Bayley Mfg. Co.
Carrier Eng. Corp.
Manufacturers Machine Co.
Parks-Cramer Co.

Humidity Indicating Instruments.
Powers Regulator Co.

Hydraulic Turbines.
(See Turbines—Hydraulic).

Hydro Extractors.
(See Extractors).

Ice Machines.
Miles Refrigerating Co.
Southern Ice Machine Co.

Illuminating Engineers.
Huntington & Guerry.
Ivanhoe-Regent Works.

Indicating and Recording Instruments and Thermometers.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Indigo.
(See Dyestuffs and Chemicals).

Indicators for Roving Cans.
O'Malley & Carroll.

Industrial Sites.
Nashville Industrial Corp.

Injectors.
Lunkenheimer Co.

Ink—Stencil and Marking.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.

Iron Work—Ornamental.
Cyclone Fence Co.
Dufur & Co.
Lombard Iron Works & Supply Co.

Jack Spools.
(See Spools).

Jacquards.
Crompton & Knowles Loom Wks.

Joint Compound.
Dixon Crucible Co., Jos.

Jute Bagging Machine.
Smith & Furbush Machine Co.

Kettles—Size.
(See Size Kettles).

Kettles—Soda.
Lombard Iron Works & Sup. Co.

Kiers.
(See Bleacher Kiers).

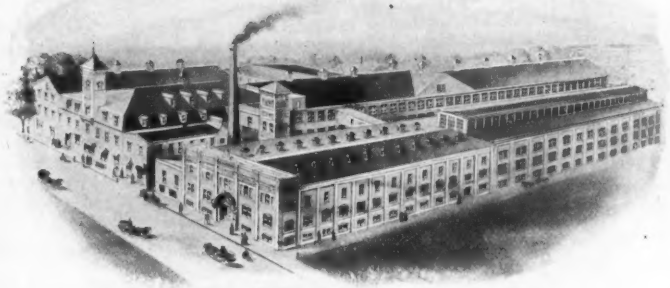
Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers).

Knit Goods Washers.
(See Washers—Cloth).

Knitting Machinery and Supplies.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Ma kem Machine Co.
Scott & Williams.
Trump Bros. Machine Co.
Wildman Mfg. Co.

Laboratory Instruments and Thermometers.
Estes Surgical Supply Co.
Perryman-Burson Co.

Lacing—Belt.
(See Belt Lacing).



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Lamps—Incandescent and Arc.
Bryan Electric Co.
Carter Electric Co.
Cutter Works, George.
General Electric Co.
Ivanhoe Regent Works of G. E. Co.
Walraven Co.
Westinghouse Elec. & Mfg. Co.

Lamp Guards—Key Locking.
Bryan Electric Co.
Flexible Steel Lacing Co.

Lamp Reflectors.
Bryan Electric Co.
Carter Electric Co.
Cutter Works, George.
Ivanhoe Regent Works of G. E. Co.
Westinghouse Elec. & Mfg. Co.

Landscape Architects.
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Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Latches (Fire Exit Self-Releasing.)
Vonnegut Hardware Co.

Laundry Machinery.
American Laundry Mach'y Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Lavatories.
Crane Co.
Manufacturing Equipment & Engineering Co.
Vogel Co., Jos. A.

Leather Belting.
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Leather Specialties.
American Supply Co.
Williams & Sons, I. B.

Lights—Flood.
Cutter Works, George.
General Electric Co.
Ivanhoe-Regent Works.
Westinghouse Elec. & Mfg. Co.

Lighting Engineers & Contractors.
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Linen Yarns.
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Link Belting.
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Linters.
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Liquid Chlorine.
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Loaders—Wagon and Truck.
Link-Belt Company.

Lockers—Metal.
Collins, J. D.
Sanymetal Products Co.

Logwood Extract.
(See Dyestuffs and Chemicals).

Looms.
Crompton & Knowles Loom Wks.
Draper Corporation.
Fletcher Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

Loom Attachments—Automatic.
Clayton & Bentley Co.
Draper Corporation.

Loom Harness.
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Lubricants.
D-A Lubricant Co.
Dixon Crucible Co., Jos.
Masury Young Co.
Moore Oil Refining Co.
N. Y. & N. J. Lubricant Co.
Swan & Finch Co.

Lubricators.
Lidseen
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

Lug Straps.
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Lumber.
Cornell Wood Product Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

Lunch Room Equipment.
(See Restaurant).

Machine Tools.
(See Tools).

Machinists.
Cresson-Morris Co.

Marking Machines.
Markem Machine Co.

Marking Pots, Stencils, Inks, Etc.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

Mercerized Yarns.
(See Yarn Manufacturers).

Mercerizers.
Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Metal Ceilings, Etc.
Lupton's Sons Co., David.

Metals—Perforated.
(See Screens and Sieves).

Metal Workers—Sheet.
Lombard Iron Works & Supply Co.

Meters—Flow, Air, Gas, Electric Steam, Etc.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Meters (Counting.)
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Mill Baskets and Boxes.
(See Boxes—Mill).

Mill Engineer.
(See Architects and Engineers).

Mill Villages.
(See Villages).

Mill Supplies—Miscellaneous.
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Mill White Paint.
(See Paint).

Mops.
Atlanta Brush Co.
Harris Broom Co.
Southwestern Broom Mfg. Co.

Motion Pictures
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Motors and Generators—Electric.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.
Nashville Industrial Corp.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.

Musical Instruments & Supplies.
Cable Piano Co.

Moving Picture Mch. & Supplies.
(See Theatre Equipment).

Nappers.
Roy & Son Co., B. S.

Napper Clothing.
Howard Bros. Mfg. Co.

Office Partitions.
Sanymetal Products Co.

Oil (Lubricating.)
D-A Lubricant Co.
Johnson & Co., Inc., Oliver.
Masury-Young Co.
Moore Oil Refining Co.
Wadsworth, Howland & Co., Inc.

Oils—Finishing.
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Oil Cans.
Lidseen

Oil Cups.
(See Lubricators).

Oil Paper.
Bradley Mfg. Co., A. J.

Oiling Devices.
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Openers for Cotton, Wool, Waste, Etc.
Brooks & Doxey, Ltd.
Lord Bros.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Overhead Carriers.
Curtis Pneumatic Mchry. Co.

Oxidizing Machinery.
Cocker Mch. & Fdry. Co.
Phila. Drying Machinery Co.

Oxygen.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co.
Standard Gas Products Co.

Packing Boxes & Cases—Wooden.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lewis Co., G. B.
Walke Box Co., Inc.

Packings.
Walraven Co.

Paint.
American Cement Paint Co.
American Roofing & Paint Co.
Barrett Co., The.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co., Inc.

Painting Contractors.
(See Contractors.)

Panel Boards.
(See Switchboards).

Paper.
Bradley Mfg. Co., A. J.

Partitions (Office and Toilet).
Sanymetal Products Co.

Perforated Metal.
(See Screens and Sieves).

Partitions—Steel.
Lupton's Sons Co., David
Sanymetal Products Co.

Peroxides.
Roessler & Hasslacher Chemical Co.

Piano & Players.
Cable Piano Co.

Pickers—Curled Hair.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Pickers—Leather.
Garland Mfg. Co.

Picker Sticks.
Garland Mfg. Co.
Southern Bending Co.
Shambow Shuttle Co.
Walraven Co.

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Pinions.
General Electric Co.

Pipe and Pipe Fittings.
Crane Co.
East Jersey Pipe Co.
Fire Protection & Const. Co.
Parks-Cramer Co.
Scaife & Sons Co., Wm. B.
Walraven Co.

Pipe Joint Compound.
Dixon Crucible Co., Jos.

Pipe Threading and Cutting Machines.
Walraven Co., The.

Playground Apparatus Equipment.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

Pneumatic Machinery & Tools.
Curtis Pneumatic Mchry. Co.

Portable Conveyors.
(See Conveyor.)

Posts—Fence (Wood.)
Southern Wood Preserving Co.

Power (Electric.)
Georgia Railway & Power Co.

Power Transmission.
Aldrich Mach. Works.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Carlyle-Johnson Mch. Co.
Columbia Novelty Mfg. Co.
Cresson-Morris Co.
Dixon Crucible Co., Jos.
Fabreeka Belting Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
General Electric Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Manufacturing Equipment & Engineering Co.
Morse Chain Co.
Skayef Ball Bearing Co.
Skinner & Co., Inc., R. D.
Slaughter Mchry. Co., G. G.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Preservative Paints for Metal Wks.
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Pressed Steel.
Lupton's Sons Co., David.

Presses.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Famous Mfg. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Printing.
Byrd Printing Co.
Dowman Wilkins Printing Co.
Richards Printing Co., J. B.
Showalter Printing Co., A. J.

Pulleys.
Brown Co., A. & F.
Dodge Sales & Eng. Co.
Cresson-Morris Co.
Link-Belt Company.
Walraven Co., The.
Wood's Sons Co., T. B.

Pulley Covering.
Williams & Sons, I. B.

Pumps.
Allis-Chalmers Mfg. Co.
Goulds Mfg. Co.
Sydnor Pump & Well Co., Inc.
Toomey Frank.
U. S. & Cuban Allied Works, Eng'g Corp.
Walraven Co.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

Pump Valves.
(See Valve Discs).

Quill Cleaning Machines.
Terrell Machine Co.

Railways.
Southern Railway Systems.

Receptacles—Fibre.
(See Fibre Products).

Recording Instruments.
Boston Machine Works.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Reeds.
American Supply Co.
Emmons Loom Harness Co.
Shambow Shuttle Co.
Walraven Co.

Reels.
Cocker Mch. & Fdry. Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Gallaudet Aircraft Corp.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

Reflectors—Lamp.
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Regulators—Liquid Level.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Regulators—Pressure.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Regulators—Temperature.
(See Temperature Controllers).

Reinforcing Slag.
Birmingham Slag Co.

Repairing—Electrical.
Bryan Electric Co.
Westinghouse Elec. & Mfg. Co.

Repairing—Textile Machinery, Etc.
Bird-Potts Co. Inc.
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Whitinsville Spinning Ring Co.
Whitin Machine Works.

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Rolls—Calender.
Butterworth & Sons Co., H. W.
Roy & Son Co., B. S.
Textile Finishing Machinery Co.

Rolls—Rubber Covered.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

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Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Machinery Co.

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Philadelphia Felt Co.

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Cortright Meta. Roofing Co.
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Wadsworth, Howland & Co.
Walraven Co.

Roof Anchors.
Fire Protection & Const. Co.

Roof and Cement Coating.
American Roofing & Paint Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
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Rope—Transmission.
Allis-Chalmers Mfg. Co.
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Cresson-Morris Co.
Link-Belt Company.
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Brown Co., A. & F.

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O'Malley & Carroll.

Roving Machinery.
Howard & Bullough.
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Whitin Machine Works.

Rubber Goods.
Estes Surgical Supply Co.
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Rubber Stamps.
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Salamanders
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Sanitary Products.
Crane Co.
Estes Surgical Supply Co.
Manufacturing Equipment & Engineering Co.
Perryman-Burson Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Sanitas Co.
Taylor, Halsey W.
Twentieth Century Brass Mfg. Co.
Vogel Co., Jos. A.

Sash-Window—Steel.
Drouve Co., G.
Lupton's Sons Co., David.

Sash Operator.
Drouve Co., G.

Scale Preventer—Boiler.
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Screens (Moving Picture).
Southern Theatre Equipment Co.

Screens and Sieves—Perforated.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link-Belt Company.

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Scrubbing Machine—Floor.
American Scrubbing Mch. Co.

Scrubbing and Washing Powders.
India Alkali Works.
Mathieson Alkali Works.
Warren Soap Mfg. Co.

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Brooks & Doxey.
Lord Bros.
Whitin Machine Works.

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Bryan Electric Co.
Nashville Industrial Corp
Textile Service & Equip. Co.
Toomey, Frank, Inc.
Walraven Co.

Second Hand Machinery Wanted.
Textile Service & Equip. Co.

Sewing Machines.
Merrow Machine Co., The
Textile Finishing Machinery Co

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Southern Wood Preserving Co.

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Textile Finishing Mchry. Co.
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India Alkali Works.

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Southern Ice Machine Co.
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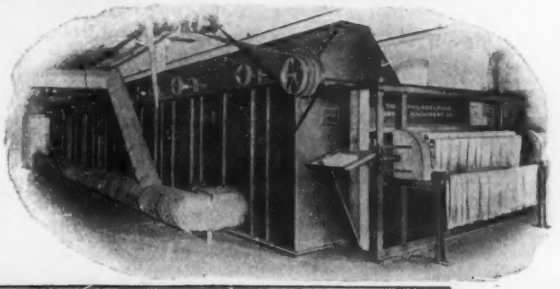

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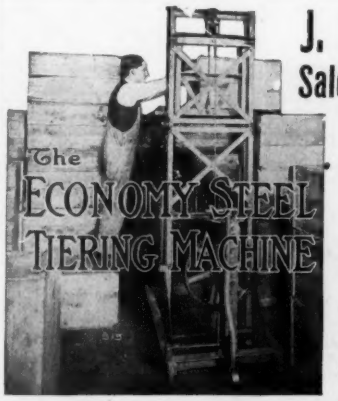

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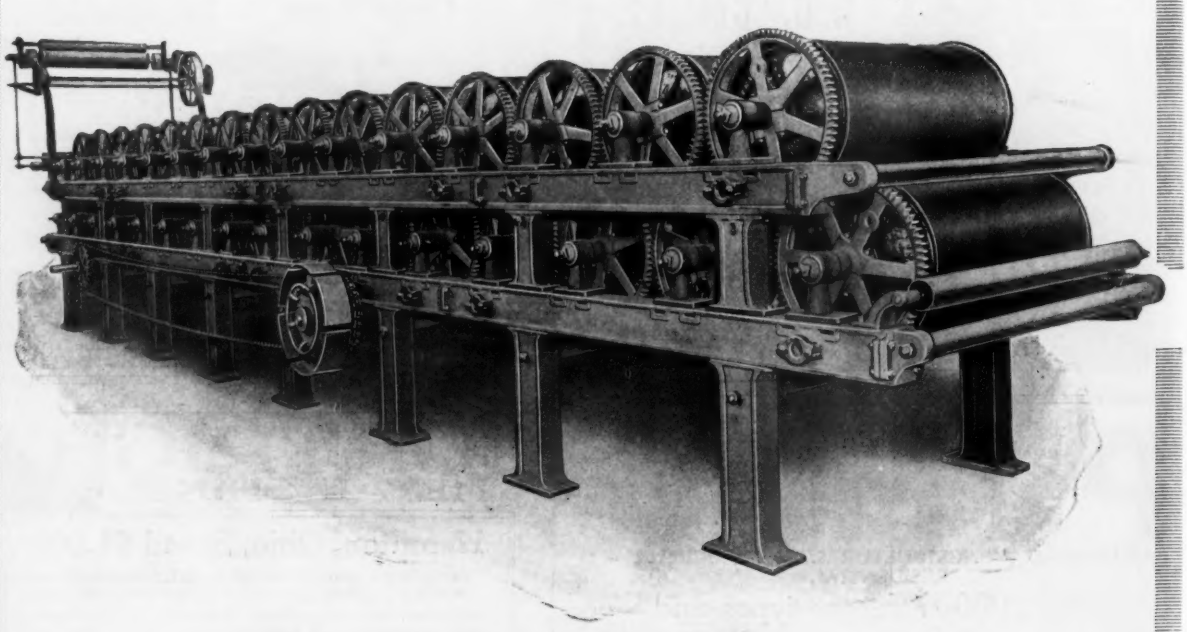

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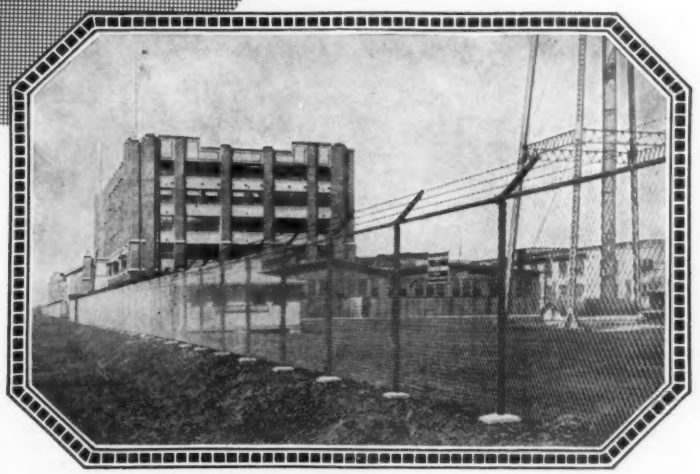

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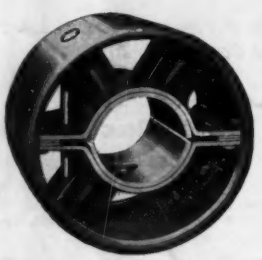

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